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NATIONAL HEALTH.











Edwin Chadwick,

NATIONAL HEALTH.

ABRIDGED FROM

"*THE HEALTH OF NATIONS,*"

A Review of the Works of

SIR EDWIN CHADWICK, K.C.B.,

Corresponding Member of the Institute of France.

BY

BENJAMIN WARD RICHARDSON, M.D., F.R.S.,

Member of the American Philosophical Society.

"Sanitas sanitatis, omnia sanitas."

LONDON

LONGMANS, GREEN, AND CO.

AND NEW YORK: 15 EAST 16th STREET


1890.

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PREFACE.

OON as the work called *The Health of Nations* was fully before the public, requests began to come for an abridged and less expensive edition.

In response, I have prepared, with Sir Edwin Chadwick's ready acquiescence, the accompanying pages, in which, under the title "NATIONAL HEALTH," the most practical and most popular parts of the larger work are condensed, without comment, into a single, handy, and cheap volume.

B. W. R.

25, MANCHESTER SQUARE, LONDON,
March 25th, 1890.

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A BIOGRAPHICAL SKETCH OF SIR EDWIN CHADWICK, K.C.B.

IN the volume entitled the *Health of Nations*, of which this volume is an abridgment, the reader will find a detailed account of the distinguished sanitarian, whose works are here condensed. The following brief outline of the longer biography may, however, be appropriately introduced in this place.

Sir Edwin Chadwick, K.C.B., was born at Longsight, near to Manchester, on the 24th day of January, 1800. His father, the eldest son of one known as good old Andrew Chadwick, was Mr. James Chadwick, a man of artistic nature, and of much ability in natural history and music. He taught botany and music to the immortal Manchester physicist and discoverer of the atomic theory, John Dalton, and he took an active part in the liberal politics of his time. He was a friend of Cowdrey, the liberal journalist, and at the time of the French Revolution he visited Paris, and later on, in company with Joel Barlow, and no less a propagandist of liberal views than great Tom Paine himself, stood once in the Champ de Mars to witness Napoleon Bonaparte, as First Consul, holding a military review. Afterwards he entered into business in Manchester; but as he did not succeed so rapidly as he wished he moved

to London, and undertook the editorship of the leading liberal paper of the day, *The Statesman*, during the imprisonment of Lovell, the actual editor, for a political libel. His temporary occupation of the editorial chair of *The Statesman* was of much service to that journal, since he introduced into its columns a moderate and judicious tone which added greatly to its influence.

His first wife, the mother of Edwin Chadwick, dying very early in life, Mr. James Chadwick married a second time, and having soon a large family to provide for, he gave up the *Western Times*, of which he was editor, emigrated to the United States, and settled in New York as a journalist. There a friend of my own, an excellent amateur violinist, knew him as an aged man who continued to cultivate music assiduously as a violoncello player of quite distinguished skill. He lived in New York much esteemed as an English gentleman of the old school, and it was said of him that "he taught how to bear old age gracefully." His death took place rather suddenly in his eighty-fifth year.

The mother of Sir Edwin Chadwick was by nature a sanitarian, and in domestic affairs played the housewife's part with thrift and gentleness; and this, he has told me, is all he remembers of her.

In the early years of his life Sir Edwin was sent to a village school in Longsight, but soon passed to a boarding-school at Stockport, kept by Dr. Wordsworth. He did not stay long at school, for when he was ten years of age his family came to reside in London, where his education was continued by private tutors, under whom he made progress in French, Italian, and Spanish.

For his profession he elected the law, and entered an attorney's office as a pupil; but after gaining an insight into the profession enrolled himself as a student of the

Inner Temple, with the intention of going to the Bar. While thus engaged as a law student he took to literature, supplying reports to the *Morning Herald* and to the *London Review*.

In 1828 he contributed to the *Westminster Review* an essay on "Life Assurance," and in 1829 two essays, one on "Preventive Police," the other on "Public Charities in France," to the *London Review*. The essay on "Preventive Police" attracted the notice of the famous Jeremy Bentham, then in his eighty-second year.

An introduction to Bentham was brought about by James Mill, the father of John Stuart Mill, and was mutually acceptable. Bentham recognised in Edwin Chadwick a new disciple, who might well be trusted to deal with his own cherished idea of fifty years, that the whole worthy work of the legislator is to enable the people to live happily; and Chadwick, responding in principle, proposed for the word "utilitarianism" the better word "felicitarianism," which Bentham adopted.

Pursuing once more his legal studies, Mr. Chadwick was duly called to the bar, and became barrister-at-law of the Inner Temple on November 26th, 1830.

The last grand work of Bentham was his Administrative Code, and Mr. Chadwick's assistance was solicited in completing it. For a time Mr. Chadwick resided with Bentham, and was with him at his death in 1832, a year singularly fatal to great men. An offer made to him by the philosopher that he should receive an endowment of £700 a year if he would devote himself exclusively to the propagation of the Benthamite philosophy was declined by him, because he had other objects of his own in view. He received, however, a legacy from the master, and was long considered as one of the most distinguished of the school which Bentham had established.

It was still doubtful what course of life he would pursue. The sanitary idea was dominant in his mind. If this idea could be carried out, disease, which was the cause of all death before the appointed time for natural death, would itself die. It was indeed a consummation devoutly to be wished, and worthy of any amount of self-sacrifice and toil. In his enthusiasm he made a personal inspection of one of the fever slums in the East End of London, and coming into too close contact with the virulent and unchecked enemy, himself was seized by it. Happily he was spared, and unmoved by the danger he had passed through, allowed his leanings for philosophic pursuits to determine his future career by the acceptance, in 1832, of the offer of public service on the Poor Law Commission, then about to be opened.

Mr. Nassau Senior proposed that Mr. Chadwick should act as one of these assistant commissioners, and after due consideration he accepted the duty. Mr. Chadwick has more than once told me that this acceptance of office was a matter to him of the gravest moment. The common-law bar was a promising field; his friends urged him to keep to his legitimate work at the Bar, and he was himself fond of the practice. The friction of debate caused him no wearing anxiety, but was rather a refreshing exercise for his mental and physical powers. He had unusual strength for work, an excellent memory for facts, figures, and details of every kind, and a preference for full hours of mental labour. These he as well as others foresaw were certain elements for success at the Bar, and a sure way to solid preferment. On the other side, the office of an assistant commissioner, while it effectually broke up legal practice for a long time, if not for good, was anything but a certain and anything but an enviable employment. It was useful, and offered scope for the possible accomplishment of great

designs, but it carried very little indeed of promise in its train.

The work of this Commission was appointed by Lord Grey's government to carry out an inquiry into the Poor Law system then existent in England; a system which, following upon the Reformation, had been enforced on the Legislature by the miseries supervening upon the destruction of the great religious houses, and which had taken final form in the Act known as the Act for the Relief of the Poor, passed in the latter part of the reign of Elizabeth, —1601. The commissioners appointed to the task were the then Bishop of London (Bishop Blomfield), the Bishop of Chester, Mr. W. Sturges Bourne, Mr. Nassau W. Senior, Mr. Henry Bishop, Mr. W. Coulson, and Mr. Henry Gawler. These were the chief commissioners, but to them were added assistant commissioners who were entrusted to visit different parts of the kingdom and to institute local inquiries; and to this work Mr. Chadwick set himself zealously, contending that larger administrative areas for Poor Law administration must be formed in order to obtain the executive service of duly qualified and responsible paid officers, acting under the orders and the supervision of a central board elected by the representatives of the people. Such duties as were to remain honorary should, he held, be those alone that were supervisory, like the duties of the visiting justices of prisons.

The plan which Mr. Chadwick himself set forth in full was, in outline, the one, in the end, adopted; and, on his becoming finally attached to the commission, he was charged with the exposition of the remedial measures advised in the report, and with the preparation of an abstract for a cabinet paper which, in due course, came before a cabinet meeting. Later on he was made secretary of the first Poor Law Board appointed under

the Act, for the reason that he would have more executive power as a secretary than as an individual member or commissioner of the board.

There were many deviations from the original Act proposed by its founder. It was a part of his design to separate the actually destitute poor into distinct classes according to their necessities. The destitute children he would have put into healthful and well-ordered industrial schools, where they would have been well fed, well clothed, well educated in physical and mental labour, and each one taught a good and useful trade. The aged destitute he would have housed in almshouses, where they could have passed the end of their days in comfort. The blind, the deaf, and the idiotic he would have placed in proper asylums where they too would have been taught, to the best of their ability, to learn some useful occupation. He would have sought out the insane from the many dens in which they were at that time confined, and would have put them into thoroughly well-managed asylums under the most competent care that humanity and science might dictate. The sick he would have had tended in large and finely adapted hospitals. Lastly, he would have reduced each workhouse to the smallest possible proportions, and would have left it for the use of those able-bodied poor who either wanted temporary work, or who would not work unless they were starved into working; a place for the support of those who would do well and a terror to those who would do ill.

SUGGESTION FOR HALF-TIME EDUCATION.

Coincident with the preparation of the Poor Law report a new duty imposed upon Mr. Chadwick led to the introduction of one of the most important of the great reforms that have taken place in the educational system of this country. By the introduction of Sir Robert Peel's Bill to

protect the young pauper apprentices employed in factories, the ear of Parliament had been reached on the subject of the over-work of children generally in those institutions. Lord Ashley, afterwards Earl Shaftesbury, had laboured for the introduction of a Ten Hours Bill, backed by Mr. Sadleir and by a few other earnest philanthropists. The Government, alarmed at the Ten Hours Bill, insisted on an inquiry, and thereupon appointed, in 1833, a royal commission, composed of Mr. Tooke, Mr. Chadwick, and Dr. Southwood Smith, as Chief Commissioners. As a member of the central board of this commission Mr. Chadwick had the executive work of preparing instructions for all the local inquirers; he drafted nearly the whole of the report, founded on the general collections and experiences, and carried out the business with such rapidity, that it was begun and ended within a period of six weeks. The commissioners agreed that any self-acting law to be executed under a local magistracy would be illusory; they recommended the appointment of Government Inspectors under a central authority, and urged that children under thirteen years should not have more than six hours' work daily.

The institution of an authority of inspection under governmental direction, which took its rise from this effort, was so practical and beneficial in its action, that it has been followed by the appointment of inspectors of prisons and of mines under the Home Department, by an extension of governmental inspections of workshops, and by various other occasional inspections of a sanitary kind from the Local Government Board. Eventually the report led to the Ten Hours Act.

Meanwhile, there resulted from the inquiry one practical proposition, which had as powerful, if not a more powerful, influence than the Ten Hours Bill itself. This related to a subject standing apart from employment in factories—

namely, the training and education of the destitute children of communities.

In drawing up the report of the factory commission, Mr. Chadwick was struck by the facts related on the subject of the work which the children were, in many cases, forced to carry on from day to day and from year to year, without any advantages of a mental kind to compensate or to relieve their physical burdens. The question was, how to bring them into better health, heart, happiness, and heritage.

This question Mr. Chadwick and his coadjutors tried to solve by proposing that the hours of children's labour should be reduced from ten hours to six, the limitation of a ten hours bill being insufficient as they believed for children. But our commissioner went further than this. He inserted a clause containing a provision that, as a condition of the employment of a child in a factory, it should present, weekly, a ticket from a qualified school-teacher that it had attended his school for three hours daily during the week preceding. He had, at great pains, ascertained that three hours of good teaching would fulfil the receptivity of children, and this provision at once secured the protection of the children from the exclusion, then general throughout the country, of the benefits of education, and against overwork.

The name given, by its author, to this system was the "*half-time system of education.*"

Into the report of the commissioners on the factory system, many other suggestive reforms springing from the same source were introduced. Prominent amongst these was one which insisted that when, in the carrying out of public works, accidents happened to the operatives from faulty construction or from machinery, the responsibility should rest on those to whom it actually belonged, namely, the owners of the works or those who were primarily the responsible persons.

In 1834 Mr. Chadwick was installed as Secretary to the first New Poor Law Board, and for some years stood forward as one of the most distinguished and industrious representatives of the official work of his time, a fact recognised by his election as a member of the Political Economy Club, of which he is now the Father, or oldest living member. The position of Secretary, combined with that of a Commissioner of the Poor Law, was extremely difficult, and finally, after the appointment of Mr. George Cornwall Lewis and Sir Francis Head as new Commissioners, he remained no longer as one of the Commissioners, but simply as Secretary, without personal responsibility of the direction. The position was strained to the last degree, and remained so until it broke under the pressure of an official inquiry connected with the Andover Union in the year 1846.

Meanwhile Mr. Chadwick looked, he has told me, for every opportunity that should give an historical future to a peculiar and sensitive position, and by constant looking for it the opportunity came in two lines, almost at the same time.

THE FIRST SANITARY COMMISSION.

In 1838 a severe outbreak of disease occurred in the East End of London, a part of Whitechapel, situated on the borders of a large and stagnant pond, being the locality most affected. So sudden and severe was the attack, that the parochial authorities were at their wits' end to know what to do or whom to consult. In their distress they thought of the active and resolute Secretary of the Poor Law Board, and to him they applied. The Secretary immediately persuaded his Board to institute a medical Commission of Inquiry; and the choice of the Commission being in his hands, he sent three of the best living men to the scene of the calamity—namely, Dr. Neil Arnott, Dr. Kay, after

wards Sir Kay-Shuttleworth, and Dr. Southwood Smith. These gentlemen were directed, not only to inquire into the existing epidemic, but to report on the sanitary condition of the Metropolis altogether. Arnott and Kay sent in a conjoint report; Southwood Smith added an independent supplement, in which, with that accuracy of description and command of language which characterised all his writings, he explained for the first time the shameless character of the water-supply, and the large extent to which it contributed to the calendar of disease and of death in the capital of the world.

A commission of inquiry of this kind was the passing novelty of the time. It caused quite a sensation, and a sensation so deep as to give origin to a continuous method of research of the same order. The reports became texts in sanitation, and were so much in demand that as many as seven thousand were distributed amongst the people—an unexampled edition of any previous medical or sanitary work outside the ranks of the medical profession.

REGISTRATION OF CAUSES OF DEATH.

The second opportunity arose in an unexpected form. For some time there had been a movement amongst the dissenting bodies to enforce on Parliament the duty of making a law that should enable the births, marriages, and deaths of all persons in the United Kingdom to be duly registered by the State, and not exclusively by the Church as established by law, and an Act was brought into the legislative chambers to that effect. Mr. Chadwick saw how important it would be, in carrying out that part of the registration which related to deaths, to introduce, not merely the number of deaths, but the cause or causes of each death. If this could be done all the great epidemics could be tabulated, together with the fatal diseases of con-

stitutional origin; with accidents and violent deaths of every kind; and with reliable records of the numbers, then very small, of natural deaths—deaths from old age and senile decay. Moreover, by this plan the preponderance of the infantile death-rate would be placed beyond dispute, with the rate of death at every after-stage of life. From the whole would come, in course of years, the materials for forming, not only a death-rate, but a life-rate also—a basis, in fact, for every available calculation of vital values.

In his anxiety to get a clause into the new Act for certifying causes of mortality, Mr. Chadwick applied to Lord John Russell, who, of the leading politicians of the time, was most impressed with his labours. For some reason, probably from pre-occupation, Lord John could not in this instance be roused to exertion. He could not, to use Mr. Chadwick's words, "be got to take hold of the idea." In this strait Mr. Chadwick wrote to Lord Lyndhurst, who soon became deeply interested in the project, and not only introduced it into the Bill in the Lords, but carried it through the Upper House with so much success that it passed the Lower House with easy transit.

One other suggestion made by Mr. Chadwick was also set aside. He proposed to have an annual census, and offered many sound reasons for this course. The annual census was perhaps too short, while the present period of ten years is too long. Five years would have been a much better period.

For the office of Registrar-General in the first instance Mr. Chadwick proposed the well-known physical scholar, Mr. Babbage, the constructor of the calculating machine. The proposition was not favourably received, the office being well adapted for the use of political patronage, to which service it has since been faithfully applied. Fortunately, the real duties of the office came into the hands of another

officer, also suggested by Mr. Chadwick, who, having truest genius and industry for the post, made it, though second in command, one of the most useful and most brilliant of triumphs that have ever been accomplished in any governmental department. This officer was the late distinguished Dr. William Farr.

LABOURS ON INTEMPERANCE AND PREVENTION OF CRIME.

In adhering to the leading lines of this biographical sketch I have omitted some incidental works which ought not to be left out. In 1833-34 a committee of the House of Commons had been sitting for the purpose of collecting evidence on drunkenness. Over this committee Mr. J. Silk Buckingham had presided, and it had become popularly associated with his excellent name. To this committee Mr. Chadwick was summoned, and in his evidence he showed that the national expenditure was fivefold that of the poor-rates, and contended that if healthy recreations were found for the masses of the people, if coffee taverns were made to replace gin palaces, if cottage gardens were supplied at a cheap rate to the labouring poor of country places, if model cottages were built for the homes of the poor, if public houses were prohibited as houses for the transaction of business, and if a gradual restriction were put upon the traffic in spirituous liquors—if these improvements were carried out intemperance would soon be a thing of the past.

In other directions our author was also occupied. They referred to three points, all having relation to the prevention of poverty by the removal of its causes. In the first of these labours he made a stout resistance to the law of settlements, which provided that a labourer or other person could not obtain parochial relief unless he had settled down or found settlement by residence for a

certain time in a parish bound. The effect of this law was that in many places tenements for the poor were razed to the ground, in order that the qualifying residency should be rendered impossible, and the poor, driven into the larger centres, were often obliged to live such a number of miles away from their place of labour that the journey each morning and night was equal to the work of the day. Against this bad and foolish system the most earnest protests were made by Mr. Chadwick. The moral of his teaching had at least a good effect. It influenced many farmers and owners to become more liberal in respect to tenements of the poor, irrespective of settlements; and it encouraged, in so far as recommendation short of legal reformation could encourage it, the erection of model cottages in agricultural districts. The law of settlement, although it is no longer maintained for parishes, exists still between Union and Union, and is a social evil, which may yet be a source of agitation and difficulty.

Two other ideas were suggested by Mr. Chadwick bearing upon the treatment of two classes of men, who were, so to speak, thrown upon the country. The men first specially referred to were navvies,—men who at one time were employed by the hundred thousand or more in making the railroads which now intersect our island. The others were the discharged sailors or soldiers, who, pensioned off after their periods of service, were scattered through the land, often lost and dissolute; and for the amelioration of the fate of the first-named of these classes he proposed several of the most thoughtful remedies. He protested against the bad system of paying the navvies the heavy wages they were earning at long intervals of time, since such payment put them suddenly into possession of large sums which they had no ready means of in-

vesting, and which, therefore, were spent in drink and debauchery. Extending these provisions to all classes of labourers, he further insisted that the most responsible persons should alone be made responsible for blameless accidents occurring from machinery and erections of buildings.

Respecting men who had been discharged from the naval and military services, he showed that in their case also much of the intemperance and squalor which were exhibited amongst them was due to the fact that they were paid their pensions at long intervals, often quarterly, by which they came suddenly into possession of considerable sums which they did not know how to lay by, and which they, therefore, spent on drink and other unthrifty proceedings. Finally, as bearing upon the lives of soldiers and sailors, he insisted on the importance of teaching these men some useful trade or occupation whilst they were engaged in the services, so that when they were pensioned off they should be able to turn their hands to some useful and profitable industrial pursuit.

WORK AS A CONSTABULARY COMMISSIONER.

On the 26th day of October in the year 1838, the new commission was issued, appointing Charles Shaw-Lefevre, Esquire, Charles Rowan, Esquire, and Edwin Chadwick, Esquire, to inquire into the best means of establishing an efficient constabulary force in the counties of England and Wales.

The organisation of the commission was so well studied and laid out, that on March 27th, 1839, the report was drawn up, printed, and submitted. In this work Sir Charles Lefevre ceased to take part before it was completed, so that all the latter part of the undertaking fell upon Sir Charles Rowan and Mr. Chadwick. The

principles of the preventive action of such a police force as was proposed, a force that should be popularly preventive of calamities as well as of crime, formed the topic of a second report. The principle advocated everywhere was the principle expounded in the original paper on preventive police, "*Get at the removable antecedents of crime,*" and then, but not till then, crime will be vanquished. Professor Masson truly remarks that some parts of this official report on police are as interesting as a novel of Dickens.

MARRIAGE.

Connected with the year 1839, an event of a personal and happy kind occurred to Mr. Chadwick in his marriage with Miss Rachel Dawson Kennedy, fifth daughter of John Kennedy, Esq., of Ardwick Hall, Manchester, and of Knocknalling, Galloway.

In settling down to work in London at first, Mr. Chadwick lived in Lyon's Inn, Wick Street, occupying the rooms which once had been occupied by Lord Coke,— "*Coke on Lyttelton*" Coke. This was up to 1833. He then went to stay with Jeremy Bentham, at Queen's Gate, Westminster, where he remained one year, until Bentham's death. After that he resided at Orme Square; and now, in 1839, he settled down at Stanhope Street, Hyde Park Gardens, a married man.

HEALTH OF THE LABOURING CLASSES.

On August 21st, 1829, Lord John Russell wrote to the Poor Law Commissioners telling them, by royal command, to institute what afterwards became the far-famed inquiry into the health of the labouring classes of the other parts of England and Wales beyond the Metropolis; and in the month of November following they (the Poor Law Com-

missioners) addressed an instruction to their Assistant Commissioners to report upon such parts of the subject as were likely to come under their observation. So the work began, and, going steadily on under the direction of the Chief Secretary, was ready for presentation in the form of a report to the Right Honourable Sir James Graham, at that time Home Secretary, on the 9th of July, 1842.

To the letter introductory of the report Mr. Chadwick's name does not appear. The signatories are "George Nicholls, George Cornwall Lewis, and Edmund Walker Head;" but in the body of the report all letters of instruction as to mode and object of the inquiry bear the name of the Secretary, and are couched with a personality and intention which leave no doubt as to the directing hand which guided the whole. The Commissioners themselves also state that, at their request, the report was prepared by their Secretary, from the papers and minutes of information that had been sent to them in the course of the inquiry. The details of this extensive labour, elaborated and enforced by the guiding spirit which called them forth, were published on the sole responsibility of Mr. Chadwick, who received for all his labour not so much as a vote or expression of thanks from those in authority over him.

INQUIRIES ON INTRAMURAL INTERMENTS.

The work of the report on the sanitary condition of the labouring classes off hand, the indefatigable Secretary of the Poor Law Board turned his attention to the question of intramural interment. The subject had for a considerable time been agitating the public mind, and one of the members of my own profession, George Alfred Walker, had, with most commendable zeal and distinguished ability, kept the agitation in full current by his remarkable papers called

Gatherings from Graveyards, Graveyards of London, Interments and Disinterments. For a complete and comprehensive statement on the whole subject the people were prepared, and before the close of 1843 they got what they desired in a report by Mr. Chadwick, as a supplement to the report on the sanitary condition of the labouring classes, and entitled *Interments in Towns*.

DISTRICT HALF-TIME SCHOOLS.

In the early part—January 21st—of the year 1840, the Poor Law Board addressed a letter to the Marquis of Normanby on the subject of the training of pauper children.

In this work Mr. Chadwick again took the leading part as the organiser of the movement. He inquired, laboriously, into the condition and wants of the English labourer from an educational point of view, taking the labouring classes into account all round,—the labourers who were employed in the fields, and the labourers who were employed in the factorics. He pushed his researches into the ranks of the Irish as well as the English working classes; and on the ground that men engaged in military and naval duties ought not to be overlooked, he made them also the subject of study for the purpose of securing for them a better schooling than they had ever before possessed.

In 1845 an allegation was made that some paupers in the Union Workhouse of Andover quarrelled, when grinding down bones, about the possession of some putrid marrow, and at the same time the doctor of the workhouse brought a series of charges against the Master. This led to an official inquiry, in which Mr. Chadwick gave evidence directly opposed to the Poor Law Board. He had no other alternative. He stated that

he had given evidence upon evidence that abuses and illegal practices in the administration of the Poor Laws reported to the Board by the Assistant Commissioners were disregarded. The result of the inquiry was that the Board was dissolved, and the Chief Secretary henceforth devoted his life to sanitation.

In 1847 he was appointed with others as a Commissioner to inquire into the sanitary condition of the metropolis, and in 1848 he was made a Commissioner of the first Board of Health, which office he retained until 1854, when the Board was virtually merged into the Local Government Board with the Poor Law Administration. In the year 1848, at the suggestion of the Prince Consort, the order of Commander of the Bath was conferred on Mr. Chadwick, who was one of the first selected to receive the distinction for purely civil as distinguished from military services. In the same year he was appointed one of the members of the Consolidated Commission of Sewers. This may be considered as the completion of his public life, from which he retired with a pension of one thousand a year.

LATER LABOURS.

On entering into private life Mr. Chadwick removed first to Richmond, Surrey, and finally, in 1869, to Park Cottage, East Sheen, his present residence. During the period of his retirement he has continued, practically, as industrious as ever in the work of sanitation. During the Crimean War he urged on Lord Palmerston to send out the three Sanitary Commissioners, Dr. Sutherland, Dr. Hector Gavin, and Mr., now Sir Robert, Rawlinson; the labours of which Commission rendered such efficient service that the second army of the Crimea came home in better health and strength than it had ever enjoyed in home service.

In 1855 Mr. Chadwick took up the subject of party political patronage, insisting on competitive examinations as tests of qualification for all primary appointments in the several departments of the Government. In 1858 he made a study of the causes of the huge mortality of our troops in India, and by a paper on this subject led the way to the formation of the Indian Army Sanitary Commission. Later on he suggested a Commission to examine and report what had been done for the prevention of disease in Algeria, and in 1867, a year in which he took a prominent part in the Paris Exhibition, he was invited to stand for Parliament as representative for the University of London, an invitation which afterwards came from Evesham and from the Kil-marnock boroughs. These proposals were not successful, a result for which many of his best friends have felt rather gratified than otherwise, their feeling being that his best services were most likely to be useful away from the sphere of parliamentary strife.

In 1871 he suggested a plan for the drainage of Cawn-pore. Later he took an active part in the formation of the Sanitary Institute of Great Britain, over the Congress of which, at Stafford, he presided in 1878. In 1881 he presided over the Public Health Section of the Sanitary Congress at Brighton, delivering on that occasion one of his ablest addresses on sanitation.

On the formation of the Association of Public Sanitary Inspectors for Great Britain, in 1885, Mr. Chadwick was invited to become President, a post which he accepted, and in the work of which he has taken the deepest interest.

On Saturday, March 2nd of the year 1889, these and his other labours received a warm recognition, first in a banquet arranged by the Association in honour of his attaining his ninetieth year, and socondly, and more

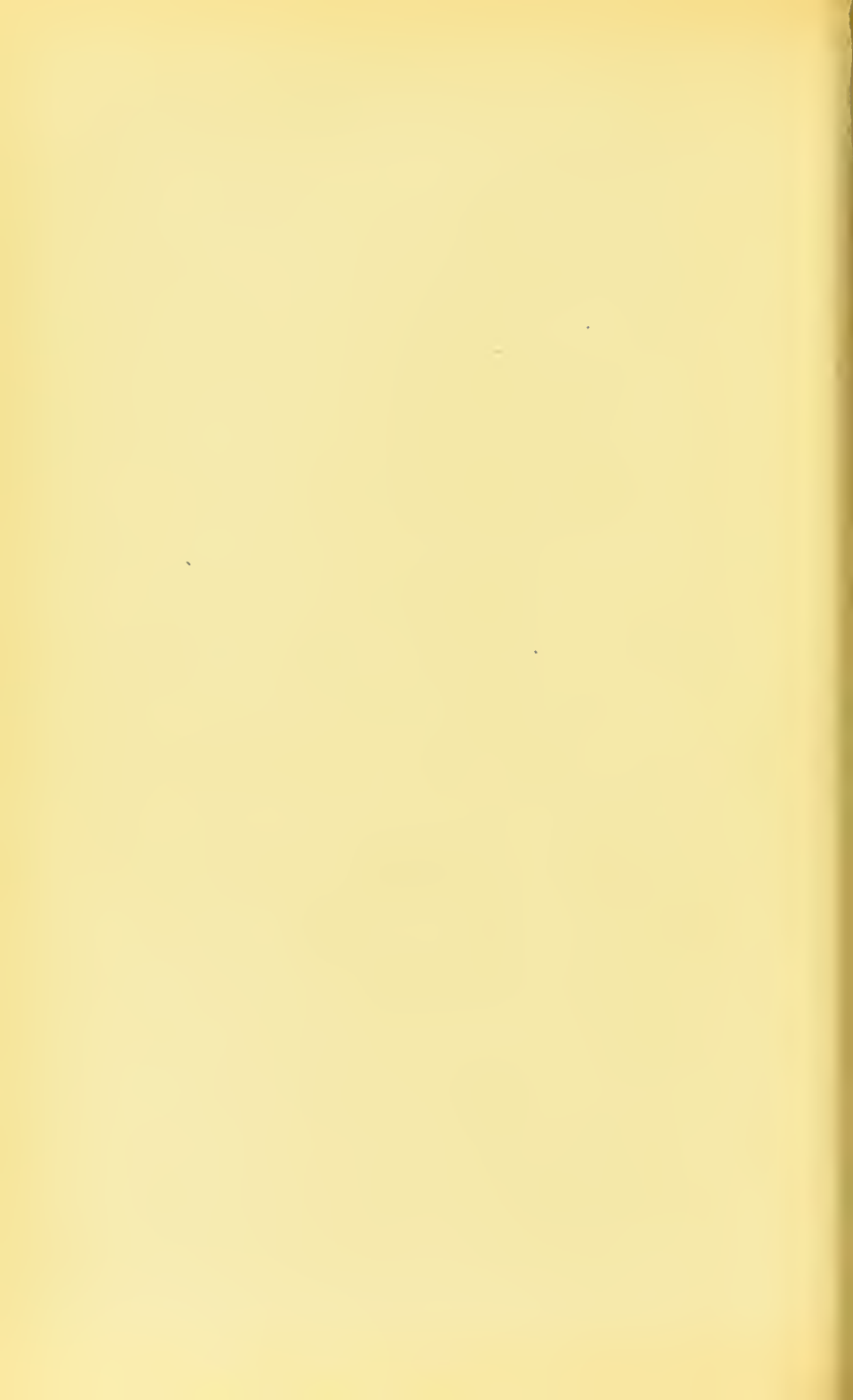
importantly, by the honour conferred upon him by Her Majesty in raising him to the rank of K.C.B.

For so much labour on behalf of the health of this nation, and of all nations which profit by English industry, few public men of this century have received fewer public rewards or favours than this man who, born with the century, stands probably at the present moment of it, when compared with others of the same term of years, absolutely alone in the possession of ability, enthusiasm, and genius. Happily no reward, no thanks can surpass those which have come so richly and so silently in the results he has lived to see as the fruits of his labours;—the foundation of a new life-saving science; the gratitude of the best and wisest of mankind; the acknowledged baptism of an imperishable name.

PART I.

HEALTH IN THE DWELLING HOUSE.

(DOMESTIC HEALTH.)



NATIONAL HEALTH.

PART I.

HEALTH IN THE DWELLING HOUSE.

CHAPTER I.

HEALTHY DWELLINGS FOR WORKING PEOPLE.

HITHERTO sanitary science has had no place in architectural art and practice. No reference is made to it in architectural treatises. Houses of the first class have the advantage of ventilation by large space, but with them economy of fuel for warming is comparatively of little concern. Convenience of living and agreeableness of aspect are the primary objects of the architect. The habitations of the poor are, moreover, of necessity of restricted space; commonly overcrowded, to the vitiation of the air; damp, ill-warmed, and ill-ventilated; and with them, though of the greatest importance, sanitary science has hitherto commonly been the least regarded.

The improvements made in England by so-called

model dwellings for the wage-earning classes have been commonly effected under the influence of the expensive habits of construction of the higher classes of houses. In the new dwellings for the wage classes the expense incident to this mode of improvement has often been the most serious obstacle to the progress of improvement.

For the removal of obstacles which may be expected to stand in the way of efforts towards the attainment of better results, the following statement of the results obtained in Great Britain may be of service.

HOUSE-RATE AND DEATH-RATE.

The measure of results by the death-rate of the number of deaths per thousand is, as a single test, confessedly open to many objections. Nevertheless, rudimentary as it is, it would have sufficed, within certain limits, to have been a test for past efforts in Great Britain. Thus, in a district in Glasgow, where the death-rate in the houses occupied by the wage classes had been about 42 in 1,000, it was reduced to 28 in 1,000 in new dwellings for them on the same site. But this effort is surpassed by others in London, where, starting in some instances from as high a death-rate, the reductions effected are to 17 or 18 per 1,000.

The measure of the single death-rate of the proportion per 1,000 of the population is, however, open to the objection that the residents of model dwellings do not all die in them, and that some die in hospitals

or elsewhere; but it is to be taken into account that the occupants of the dwellings displaced die in far larger proportions in public institutions.

The adoption of a common form of return would be of value, as leading to the improvement of the general returns, so as to show more clearly the extent of the positive and comparative prevalence of preventable causes of death amongst different classes in different cities. A death-rate which is a mean of the death-rate of the whole population of a city is almost invariably a pernicious misrepresentation. Thus we have part of a sub-district in London, comprising houses in good condition, where the death-rate does not exceed 11·3 in 1,000, whilst there are adjacent dwellings within the same sub-district where the death-rate rises to the extent of 38 in 1,000 from year to year. A mean of the two is a misrepresentation of the condition of both. It is now reported that there are particular localities in London, where the death-rates are from year to year upwards of 50 per 1,000, districts overwhelmed and overlooked in the great general mean, which heavy death-rates are primary objects for attention and relief.

One elementary test of the condition of any class of houses is the extent of the prevalence of the diseases agreed to be classed as the foul air diseases, or of diseases of the epidemic, endemic, or zymotic class. Another primary test is that of the infantile mortality, the first of which is the proportion of the deaths of infants under one year to the births of infants within

that same year. This has been chosen as a primary test, because infants are to the least degree affected by fluctuations from changes of residences, because they are to the least extent affected by occupations, because they are most of their time in the house, and because infant life is most affected by vitiated air. Where the death-rates of all classes, adults included, have a range of from one to two, the death-rates of children have, in England, a range of from one to three, or more. We may extend this test usefully to the infantile deaths below five and below ten years of age.

The most useful death-rate as a measure of health is the comparative death-rate from the foul air diseases prevalent amongst the large classes of society, especially the poorer classes, because these are classes found to denote most largely the comparative influence of the different conditions of habitations. One provision for this object is that of the mean age of death of each class as denoting the number of years of life actually attained by those who have died—a form of return which is not perplexed by the comparison of deaths beyond it, and which does not include that other living population which is usually a shifting population, not easily to be got at, if at all. An illustration of the value of the different forms of returns is given in those obtained by the Sanitary Commission for the Metropolis in 1843. In that year the general death-rate, the common test of the population, was 24 per 1,000. A study of the common form of return of the

proportion of deaths to the living of all classes will show how little useful information was to be got from it, in comparison with the return for the same year given in the subjoined footnote.*

The deaths amongst each class indicate largely the localising conditions—chiefly of the dwellings—of each class. The statistics might be inferred from an examination of the relative local conditions of the habitations, and may be taken as measures in great part of the influence of these conditions. Thus the known differences of the foul air conditions are attended by corresponding differences of the foul air diseases amongst the higher and lower classes, of more than three to one, or 6·5 to 22·2. These conditions affect most powerfully infant life, and the relative amounts are displayed in the proportions of deaths under ten years of age, of 24·7 to 54·6. The

* 	Proportions per cent. of deaths from epidemics to total deaths of each class.	Proportions of deaths of children under 1 year to births within that year.	Proportions per cent. of deaths of children under ten years to total deaths of each class.	Mean age of death of all who have died, men, women, and children.	Mean age of all who died above twenty-one.
				Years.	Years.
Gentry, professional persons, and their families. }	6·5	1 to 10	24·7	44	61
Tradesmen, shopkeepers, and their families. }	20·6	1 to 6	52·4	23	50
Wage classes, artisans, labourers, and their families. }	22·2	1 to 4	54·5	22	49

conditions mainly shorten adult life in the proportions of 49 years to 61 years of the respective classes in town districts. In model dwellings the death-rates of children under ten years are brought nearly to a level with the death-rates of children of the highest class, and are nearly one-half the general average of the children's death-rates of those years.

The power of sanitation by means of the house alone, it may be observed, is shown in England by the effect of the proceedings of the police of the Metropolis and other cities in respect to the common lodging-houses, which, from having been seats of the worst epidemic diseases, have now a comparative immunity from those foul air diseases which, in the proportions displayed in the above table, ravage the residences of the working classes. London is talked of as a healthy city by those who know little of the subject—a healthy city where the deaths from such diseases amount to upwards of 20,000 yearly, and where the infant mortality is double!

IMPROVED DWELLINGS AND DEATH-RATES.

The great question to be considered is:—In what time and in respect to what number of population may the results of improved dwellings be determined by means of death-rates?

In the British metropolis, with new villa residences for the middle classes, residences which are sometimes, by inadvertence or the omission of forewarning, occupied immediately after the construction has been completed, excessive disease is manifested in a new row of

houses within a month after their complete occupation. Nine months is the period during which it is deemed unsafe to occupy even new first-class houses in London; nine months might therefore be taken as a period of trial. The period may be taken determinable for the purpose in question chiefly by the absorbency or the non-absorbency of the materials of which the walls are constructed, and by the time required to dry the walls completely.

In some of the houses of the working people, the materials are of so absorbent a quality that they are scarcely ever completely dried. The perfection of sanitary construction is with material of a non-absorbent quality, and with walling of glazed and impermeable surfaces. Houses of such construction and with dry timber, may be safely occupied immediately after completion. Good concrete, made of Portland cement and gravel, has not one-fourth of the absorbency of the common bricks or building stones; and the proportion of moisture which it gives off is so much less, in effect, that from a fortnight to one month is assigned as the period of comparative safety. But this material and a combination of lime and clay invented by the late General Scott, called selenite,—which, if properly compounded, may be regarded as a moulded stone of double the strength of the ordinary brick and of one-half more strength than the common building stones,—admits of hollow floors and of hollow walls, with channels for the permeation of warm air, as adopted by the late Mr. Pope, after the Roman method

of construction. The warmth and dryness for secure occupancy may then be almost immediate. These concrete constructions are moreover generally one-third less in expense than the common brick constructions. General Scott's selenite, indeed, if boiled in gas tar, is rendered properly non-absorbent, stronger, and of less price than Portland concrete. On the whole, in British experience, about one year may be assigned as a full period for the determination of well-ascertained, positive, and comparative results of good house construction. As between improved constructions, the comparative merits may, however, be determinable in much less time.

TESTS OF SANITATION BY NUMBERS OF HOUSES.

The next question to be dealt with is one relating to the number of houses requisite to obtain determinate results. Observation on this point is as yet very imperfect. The most recent observation is that some forty or fifty houses or families, or from two to three hundred of population on each side, well observed, will form a sufficient basis for determination. But we have had no observation of the comparative amount of sickness in the new dwellings, which may therefore only be guessed at from the death-rates. On the opening of the first block of model dwellings in London, an apothecary set up a shop opposite to them, on the calculation that such a population would fully require his services. But he soon discovered that he was out of his calculations, and that they did not require his drugs to any such

extent as to enable him to live, so he managed to sell his business to another, who speedily ascertained the same result, and abandoned the premises, which were taken by a provision dealer, who obtained a satisfactory trade. As good house-drainage and complete sanitary work has proceeded, house by house, in old houses, low health has been improved, but there has not been sufficient observation as to the time of the alteration of the death-rates to ascertain the narrowest basis as to numbers.

The best proximate observation as to the effects of sanitation, in time, on limited numbers, would perhaps be derived from passengers in emigrant ships, from whom distinct death-rates might have been obtained within the period of a voyage to Australia. Between two ships, alike in all respects, but the one ship constructed of new and green timber, and the other of old and dry timber, there has been a forewarned marked difference of the death-rate within the voyage. In the first voyages, from ignorance of sanitation, from overcrowding, from filth and bad ventilation, the death-rates were fearfully severe, and as many as a third of the passengers died, and were buried in the sea, before the termination of the voyage. At last, by a simple alteration of the terms of the contract with the shippers, which had the effect of a perpetual prize of the nature of that now proposed, by awaking attention to sanitary appliances, and making interest coincident with duty, the state of things was wholly altered. The alteration was in not paying, as heretofore,

on the number of emigrants embarked, no matter what became of them, but in contracting to pay only for those landed alive. The shippers, of their own accord, engaged officers of health to take charge of the passengers, and paid those officers of health also only for those landed alive. By these contracts there was ensured to every poor passenger affectionate attendance, and at least one sincere mourner if anything happened to him. The general result was, in a little time, an extraordinary manifestation of the power of sanitation, and lower death-rates by one-half than had prevailed amongst the same classes of passengers when living on shore.

If the interests in sanitation could be effectually combined with duty, the most important results might be obtained. Between one institution and another for the reception and care of destitute children, between prison and prison, data for safe comparisons are generally obtainable ; and the like may, by better observation of the children's death-rate, and the foul air diseases, and others, be obtainable between one block of model dwellings and another.

It may then be taken as the general conclusion, that a population of some forty or fifty families, with a death-rate comprising the infant mortality, as stated, and with the proportion of deaths from the foul air diseases, would, if well observed, form within a year a safe basis for comparison, for the adjudication of the proposed prize.


A valuable improvement on the display of the

course and seats of epidemic disease, which I gave by maps in the report on the sanitary condition of the labouring population of Great Britain of 1842, has been made by Dr. Janssens, of Brussels. Dr. Janssens marks regularly the sites of such disease with coloured pins on a town map, in the same way as the position and progress of campaigns is marked by coloured pins on military maps. This expedient might be well adopted by all local authorities. It would display to them at once the positions and courses of the enemies against whom they have to contend.*

* As germane to this subject, I may mention that at the Health Congress held at Brighton, under the Presidency of Dr. B. W. Richardson, in 1881, I made the following observation relating to the Health of Towns. "At the first general Board of Health, of which I was chief executive officer, we had in 1848 warnings of the approach, from India, of the cholera, and that threat of an infliction of a heavier slaughter by thousands than could be inflicted by the visible enemies of the largest hostile foreign hosts. Our first examination was as to the nature and state of the former defences considered to be established. The old routine, under the Privy Council office, was for continued outward defences by strict quarantines, and when these defences were broken through, by the establishment of hospitals and the curative treatment of the sick in them. We showed by a report on quarantine, which was accepted and translated for circulation, that quarantine service, as practised on the Continent, would be like an attempt to shut out the east wind. It appeared to me and my colleagues on examination, that the great impending visitation would probably advance on the lines of the local insanitary conditions on which ordinary epidemics now proceed, and our conclusions were correct. In Poor Law Administration it was an experience of observant medical officers that where the atmosphere was warm, moist, and stagnant, they found there would be an increase of some foul air disease, typhoid, scarlatina, measles, small-pox, one species or another of eruptive disease, in such weather, in low-lying, ill-drained, and insanitary localities."

CHAPTER II.

THE CONSTRUCTION OF HEALTHY DWELLINGS.

FROM observation in the course of my official service in England, the bases for the construction of sanitary dwellings would be as follows :—

SITES.

First, to begin at the beginning—the sites for the foundations of houses.

It was an early direction of that very able army sanitarian, Sir John Pringle, in his work on “Diseases of the Army,” that for the selection of sites for encampments, observation should be made of the height of water in wells near the surface ; for he said he had always remarked of the places where the water in wells was near the surface, that they were bad camping grounds.

The soundness of this observation has been proved of late times in towns newly drained under the Public Health Act, where the drainage works when properly executed have lowered the subsoil water, and lowered the water in wells. The result has been a considerable reduction of the diseases of the lungs. For various

reasons the first item proposed, therefore, for a healthy house should be,—

That the water table of the site of the house and the adjacent uncovered land should be lowered by subsoil drainage to not less than three feet from the surface.

In some instances, no doubt, the object is only to be accomplished on a wide field by the work, not of the architect, but of the engineer. However that may be, it may be pronounced absolutely that the land which is water-logged, land with water close to the surface, land which in Sir John Pringle's experience is "bad camping ground," is also bad building ground, and should be excluded as unfit by the sanitary law and specification, until by proper work it is made fit.

FLOORINGS AND WALLS.

Assuming that this first condition of the sanitary specification has been complied with, the habitation, even upon a clean, well-dried gravel foundation, should be protected from rising wet or damp, or from earth exhalations, by another provision, viz.:—

The flooring and walls of the house should be constructed of a material which is impermeable to wet, and so laid as to exclude ascending moisture or damp, and all earth exhalations.

This ought absolutely to be provided for, and it may be accomplished by several means, as by a Portland cement concrete, or most completely by

an asphalt covering, or by vitreous tiles laid upon a good concrete.

On "the wall question," it may be stated that those medical officers who visit the common crowded dwellings of the poor in our towns, even when they are unoccupied, are aware that the walls have a peculiar depressing, musty, or foetid smell. On visits after severe epidemic attacks in some of these dwellings a peculiar offensive smell has been perceived, and on inquiry what that could possibly be from, the answer has been that it was the "dead man's smell," the dead body having been kept too long near the wall in a state of decomposition before it could be removed for interment, and the foetor still adhering to the wall.

In the course of the first service under the Public Health Act in England, in cases where the occupiers were all struck with fever, in some instances all the occupiers were ordered to be removed, and the walls and ceilings to be lime-washed. But it occurred that the performance of this service was obstructed or neglected with respect to particular houses, and in those uncleansed houses, and in those alone, and with fresh occupants, the fever has broken out again—thus demonstrating the condition of the "leprous house," the walls of which were required to be scraped all round, and in which the work of purification was insufficient. Walls lathed, plastered, and papered are even worse for such tenements. The laths rot, the size of the paper decomposes, and the paper itself

harbours vermin. The condition of some of the houses of this construction is horrible. To admit of the cleansing of the walls by lime-washing in various modern dwellings, the walls have not been plastered or papered. In some instances, the sanitary orders are that the walls should be lime-washed twice, and in other instances as many as four washings a year are deemed necessary.

The conclusions in respect to "washable walls" are opposed to extensive observation of the higher and middle-class dwellings, which have soft, permeable walls, with lath and plaster, papered, and which do not smell. But the cubic space in the better class houses is usually four times greater, occupied partially instead of constantly, whilst the lower class houses are occupied night, as well as day, by double the number of persons. In the first class of houses, however, on the occurrence of cases of scarlatina or the like, it is prescribed as necessary to re-paper the walls. Moreover, in larger rooms of the first-class houses it is found that illness is at times occasioned by the decomposition of the size used for papering, and by arsenical and other materials used for paper.

The condensation of moisture on painted walls, or on walls faced with quick conducting materials, in unoccupied rooms, is often confounded with transuding wet, and objected to as a cause of damp; but washable interior wall-facings have been provided for cottages which are not exposed to this inconvenience.

The occupiers greatly dislike the bare brick walls

provided in some model dwellings. In hospitals the evil is in great measure prevented by facing the interior wall with some hard and smooth surface, generally of the best non-absorbent and washable cement. As a principle, the surfaces of all interior cottage walls should be washable.

Besides the evils arising from the absorbency of the animalised gases by walls of the ordinary construction, there is the common evil of the absorbency and retentiveness of water or damp. In England the common bricks absorb as much as a pint or pound of water. Supposing the external walls of an ordinary cottage to be one brick thick, and to consist of 12,000 bricks, they will be capable of holding 1,500 gallons, or $6\frac{1}{2}$ tons of water when saturated. To evaporate this amount of water would require the consumption of nearly a ton of coal. A medium brick holds $12\frac{1}{2}$ oz. of water; a piece of well-made cement of the same size only half an ounce, or a twenty-fifth part as much. Yet new constructions are made in ignorance or disregard of such comparative conditions; as also of relative economies, to the extent of 6*d.* per cubic foot of space for cottages that are dry, as compared with 1*s.* per cubic foot of space for ornate cottages that are damp. The softer and more workable stones are of various degrees of absorbency, and are often more retentive of moisture than common brick.

Professor Ansted states that the facility with which sandstone absorbs water is illustrated by the quantity

it contains both in its ordinary state and when saturated. He states that even granite always contains a certain percentage of water, and in the dry state is rarely without a pint and a half in every cubic foot. Sandstone, however, even that deemed fit for building purposes, may contain half a gallon per cubic foot, and loose sand at least two gallons. When water presents itself in any part of such material, it readily diffuses itself by the power of capillary attraction, by which, as it was observed on some walls in Paris, it ascends thirty-two feet from the foundations.

Walls of absorbent construction are subject to rising wet by capillary attraction, as well as to the wet of rain or storm. To guard against the driving wet on the coast, expensive external coverings, "weather slate," are used. But these do not stay the rising wet. Impermeable string courses are put in some walls to stay the rising wet, but they do not stay driving wet. This wet having to be evaporated lowers temperature.

EFFECTS OF DAMP WALLS ON HEALTH.

Damp walls of houses cause rheumatism, lower strength, and expose the human system to other passing conditions of disease. The majority of the bent figures in our villages are due to infliction of rheumatism from damp. An experienced traveller in England laid down a rule to avoid bedrooms with northern aspects, which having less sun upon them were, when unoccupied, the most damp, and if the bed touched the wall, there was the most danger of

a damp bed. To keep out the damp an extra quantity of fuel is necessary. The evil is the greater with the poor, who are often obliged to leave their rooms without the fires which the more wealthy are enabled to keep up.

The first lesson set in the model cottages erected by Prince Albert was that an improved sanitary construction with hollow brick, or pot walls, with glazed and impermeable and washable surfaces, should be adhered to. It should, therefore, be proposed as one of the terms for building a sanitary dwelling, in respect to the wall including the ceiling:—

That it shall be constructed of a material of the first order as a non-conductor of heat.

That it shall be impermeable to water and to gas.

That it shall be washable inside and out.

That it shall be of a material that shall not harbour forms of low organic life.

To which may be added this:—

That the facing shall be of a light agreeable colour.

WINDOWS AND LIGHTS.

In considering the complete sanitary construction of the house, the window has to be taken into account.

It is of sanitary importance to increase the light and sun warmth, by increasing the window space in houses, and especially in cottage dwellings. But if we do that with thin window-glass, we diminish

warmth, and to that extent diminish the effect and the value of house shelter in cold weather. It is, therefore, proper:—

That the windows shall be of such thickness and arrangement, that the retaining power, or the non-conducting power of heat, shall be equivalent in cold weather to the non-conducting power of the outer walls.

It has been a frequent question put in Scotland, “Why do you make the window so small, now the window-tax is removed?” The answer is, “Because, if we make windows large, the rooms will be so cold in winter in our climate.” It is commonly overlooked, in respect to this class of dwelling, how rapidly large windows radiate heat. As a rule, under the old constructions, about one-third of the warming powers was in cold weather radiated through the windows; but a double window, with the stratum of air between, makes the window-space about equal to the common wall-space in non-conducting power, while very thick plate-glass approximates, in proportion to its thickness, to the double windows. By one experiment in winter time it was found that the difference in radiation (the thermometer being at 20° F.) between a thin window and one of thick plate-glass is about 8° F. To bring this home to the case of labouring class dwellings. If a man pays a shilling a week, as he generally does in London, for his coal for warming his one room in winter, nearly one-third, or fourpence, would be wasted through a thin window. Now,

this waste of heating power would compensate for getting a thick glass or a double one. Moreover, a very thick window is very difficult to cut or break through, and may, with a curtain, save the expense of shutters.

VENTILATION.

Having got the house weather-tight, and damp-proof, and miasma-proof, with washable and non-absorbent walls, we shall, nevertheless, if we have them closed almost hermetically, have only placed the population in small crowded rooms, under a set of inverted receivers of vitiated and phthisis-producing air and—if the crowding is intense—fever-producing air. It is, therefore, proposed, as most important heads of sanitary specification for ventilation, that the construction shall be such as:—

1. *To change the air of each living and sitting-room completely, not less frequently than three times an hour.*
2. *To change the vitiated air for air that is warm as well as fresh.*
3. *To save more than one-third of the chimney heat, seven-eighths of which in the common constructions now passes away unapplied.*
4. *To apply advantageously the radiant heat of the open fireplace.*

Those requirements are now attainable by simple yet inexpensive means, through a perfected invention of Sir Douglas Galton.

The principle of the invention consists in surrounding a smoke flue, which may be of stoneware or of iron, with a fresh-air flue, the fresh air being taken from the outer air. The heat of the smoke flue expands the air in the fresh-air flue, and causes it to rise in a current, which is discharged—warmed—near the ceiling of the room, across which it spreads. The air then descends, and mixing with the colder and heavier air beneath, is carried with the current into the open fireplace, and is thence discharged as vitiated air through the smoke flue. The smoke flue, surrounded by a fresh-air flue, constitutes a pump, pumping into the room warmed fresh air in quantities proportioned to the warming power of the smoke flue and the adjustment of the size and length of the fresh-air flue.

There are objections to ventilating with dry heated air, but the late Dr. Parkes, of Netley, made a series of experiments, which show that, at the rate at which air passes through the fresh-air flue, and the short time of its contact with the heated surface, it is carried into the room with its hygrometric condition very little altered.

Another effect produced by the invention is the maintenance of an equable temperature in all parts of a room, and the prevention of draughts. The soldiers in the barrack-rooms where it has been introduced say that they are better warmed; and that they are not now roasted in front whilst they are frozen behind, as they were with the old grates.

It prevents smoky chimneys, by the ample supply of warmed air to the room, and by the draught created in the neck of the chimney, by the peculiar form of fire-grate which Captain Galton adapts to the smoke and air flues. It also largely economises fuel, by making use of the spare heat which would otherwise be carried up the chimney. There are no patents for these contrivances, and the expense of the new apparatus is inconsiderable as compared with the economy produced.

It is claimed also for an improved ventilating grate, with a large warming surface for fresh air admitted into the room, invented by M. Chas. Joly, the writer of what I consider the best treatise on warming and ventilating, that his grate attains conveniently and cheaply the object of the chimney ventilator.

GAS.

A minor provision—having relation to ventilation—where gas is introduced into dwellings, is:—

That for every gas burner introduced into any part of the house a separate channel shall be introduced for carrying away the products of combustion.

This is an important sanitary provision, urgently advised by gas managers, who well know the nature of those products, but it is difficult and dangerous to carry away those hot air flues through the common timber floorings. Through floorings of concrete such channels may be conducted on first construction, with comparative convenience and without danger.

WATER SUPPLY AND SEWERS.

For the water supply of dwellings it should be required that :—

Water supplies shall be carried to every floor by pipes which, if of lead, shall be protected in the interior by a composition preventive of any action of the metal upon the water.

On each floor or landing there shall be provided a sink with a waste or return pipe, communicating with the house drain, and each such sink or waste pipe shall be so trapped as to prevent the escape of any vitiated air from the house drain or the sewer into the premises.

The house shall be provided with a water closet, on the syphon principle, so shaped and provided with water as to be effectually self-cleansing, and connected with a house drain of such form, size, and inclination, as to be effectually self-cleansing throughout, and to remove everything at once from beneath the premises ;—to be so trapped as to prevent the ingress of vitiated air from the sewer, in the event of accidental stoppages ; and to be at all times free from foul smells.

Accidental stoppages only are required, under proper instructions, to be provided for by flushing inasmuch as where sewers are properly constructed, they are self-cleansing, and are free from deposit ; there is no decomposition of stagnant matter ; no need of flushing, and but little need of trapping, except to ward off the consequences of accidental stoppages.

SUMMARY RESPECTING THE HOUSE.

The complete construction of the house must be such that if it be left clean, and unoccupied for any time, it shall remain dry, free from any close, musty, or foul smell, and be immediately habitable, without the need of fires, or of any special preparations for safe occupancy in winter or in summer.

For the completion of the rudimentary sanitary provisions connected with dwellings, it is necessary to add other requirements, not to architects or to house builders, but to the local authorities having charge of the local drainage works, viz.:—

That the sewers for the reception of all house drainage shall be constructed of such form, size, and inclination as to be completely self-cleansing; to remove constantly, and without leaving any deposit, the refuse discharged into the sewers; and, without occasioning any need of flushing except for accidents.

That all animal or vegetable matter removed from beneath the sites of houses, streets, and towns, in suspension in water, shall be deposited on soil appropriated for its reception for vegetable production, and shall be deposited and applied usually within the day of its production, or before it can enter into any noxious stages of decomposition, or give off any noxious emanations.

All this may now with competent sanitary scientific engineering be accomplished.

STREETS AND FOOTPATHS.

In respect to the surfaces of the footpaths and streets of towns, it ought to be provided that:—

Both the foot-ways and the carriage-ways shall be covered with a surface impermeable to water and washable.

Both foot-ways and carriage-ways shall be regularly washed at stated intervals and at such times, daily or weekly, as the state of the traffic may require.

This may be done with an economy of clothes, as well as of furniture and goods, in houses and shops, under competent sanitary administration.

The same is conducive to the dryness of the town atmosphere, to the purity of the air by the prevention of puddles of decomposing refuse of all sorts, and to the cleanliness of the person, clothes, and furniture of the inhabitants. Where towns are well administered, the water ought to be carried into the lower-class habitations at a rate of three-halfpence a week; the waste water should be carried away, with all excreta, for about a penny a week, and the streets washed for another penny per week per house.

PROMISES OF RESULTS.


With external as well as internal provisions duly made under their direction, experienced officers of health will agree that we should make a large alteration in the sickness and death-rates, and in the moral as well as the physical condition of the people. With

these new conditions, in cities, inhabited by an educated population competent to apply them, the sickness and death-rates might be reduced greatly beyond those in the public institutions which show the lowest mortality, where they are yet applied only in an incomplete manner.

The primary merits of sanitary science and art in the construction of dwellings may be confidently tested after occupation by the smell, by dryness and freshness of smell when the occupants are out; by the absence of the bad drain smell, of mustiness, of damp, and of the foul wall smell,—“the dead man’s smell,”—and by warmth in winter, with coolness in summer. According to the presence of these primary good qualities, so will there be, in a great degree, a reduction of sickness-rates and death-rates, especially amongst children and those who are much in the house.

CHAPTER III.

THE WATER OF THE DWELLING HOUSE.

UPPLIES of water obtained from wells by the labour of fetching and carrying it in buckets or vessels do not answer the purpose of regular supplies of water brought into the house without such labour, and kept ready in cisterns for the various purposes of cleanliness. The interposition of the labour of going out and bringing home water from a distance acts as an obstacle to the formation of better habits; and it is an important principle to be borne in mind, that in the actual condition of the lower classes, conveniences of this description must precede and form the habits. It is in vain to expect of the great majority of them that the dispositions, still less the habits, will precede or create the conveniences.

Even with persons of a higher condition, the habits are greatly dependent on the conveniences, and it is observed that when the supplies of water into the houses of persons of the middle class are cut off by the pipes being frozen, and when it is necessary to send for water to a distance, the house cleansings and washings are diminished by the inconvenience.

Every presumption is thus afforded that if it were at all times requisite for them to send to a distance for water, and in all weathers, their habits of household cleanliness would be deteriorated. In towns where the middle classes have not the advantage of supplies of water brought into the houses, the general habits of household and personal cleanliness are inferior to those of the inhabitants of towns who do enjoy the advantage. The families of the labouring man in the manufacturing towns rise early, before daylight in winter time, to go to their work; they toil hard, and they return to their homes late at night. It is a serious inconvenience, as well as discomfort to them, to have to fetch water at a distance out of doors from the pump or the river on every occasion that it may be wanted, whether it may be in cold, in rain, or in snow. The minor comforts of cleanliness are, of course, foregone, to avoid the immediate and greater discomforts of having to fetch the water. In general, it has appeared in the course of the present inquiry that the state of the conveniences gives, at the same time, a very fair indication of the state of the habits of the population in respect to household and even personal cleanliness.

In most towns, and certainly in the larger manufacturing towns, those members of a family who are of strength to fetch water, are usually of strength to be employed in profitable industry, and the mere value of their time expended in the labour of fetching water is always much higher than the cost of regular supplies

without the inducement of salaries to the managers, and of returns of interest to the capitalists; although the cost of most of the supplies at the highest is much lower than the labour of fetching water from a pump close to the house, and no valid objection appears against compulsory provisions for water being laid on (*i.e.*, for existing charges of labour being reduced) in the tenements of the labouring classes in towns, at the common charge of the water companies; still the appearance of a profit and dividends on the supply of a natural commodity does, in the new districts at least, furnish pretexts for the objection of the poorer owners and ignorant occupiers to the supposed expense of the improvement which consists in an immediate outlay. Apart from such objections, however, it is a mode of obtaining supplies attended with great inconveniences, which it is desirable to have considered with respect to new improvements. The payment of a dividend for an improved supply of such a commodity will be found as imperfect a measure, even of its pecuniary value, as it would be of the pecuniary value of a good and abundant supply of air and of the light of day. There are indirect effects of the use of such a commodity, of which a pecuniary estimate cannot conveniently be made, as against an immediate outlay. For example, there is little ground left for doubt that the effect of street and house cleansing, by means of the supplies of water needed in the worst districts, would occasion considerable reductions in the pecuniary charge of sickness on the poor's rate, but it would be

extremely difficult to obtain these results in money so as to make up, with any pretence to accuracy, a profit and loss account as an undertaking for the outlay. The evidence afforded by the creation and success of a private company proves only that a certain class of people so far appreciate the advantages of the supply as to be willing to incur such an immediate expense as will cover the cost, and yield a profit to the undertakers; it proves nothing as to the intrinsic value of the service or the commodity, which may be immense to the bulk of the community, and yet not one be found ready to volunteer to defray a portion of the expense. But the expense of the machinery of water companies, as already stated, is disproportioned to the means of the smaller towns, and to a large part of the country; and generations may pass away amidst filth and pestilence before the scientific means and the economy of prevention can be appreciated by them.

There are further objections made in towns to the mode of supply itself. One is, that it creates strong interest against all improvements in the quality or the supplies of water, for every considerable improvement creates expense, which is felt in diminution of the dividends of the private shareholders; and so long as a majority of the ratepayers are content with bad water, or deem it hopeless to seek to obtain water of a superior quality, so long as any public clamour will not endanger the dividends, it appears that no amendment entailing considerable expense can be expected.

Even where there are convenient unappropriated streams, and a wide field is afforded for competition by a very populous district, the competition of different companies does not necessarily furnish to the individual consumer any choice or amendment of the supplies.

The competition frequently absorbs the profit on the funds that might be available to the competing parties (supposing them disposed to carry out any plans other than those which have for their object the cheapest supply that can be procured), and does not reduce the charge of the supply of water to the public. At one time there were three sets of water-pipes belonging to three different companies passing through the same streets of a large proportion of the Metropolis. This wasteful competition of three immense capitals sunk in the supply of one district, for which the expenditure of one capital and one establishment would have sufficed, ended in an agreement between the competing companies to confine themselves to particular districts. The dividends at present obtained by the shareholders of the chief companies in the Metropolis on the capital now employed appears, however, to be only 4, 5, or 6 per cent., but this is on several expensive establishments and sets of offices, which appear to admit of consolidation. The committee of the House of Commons which investigated the subject of the supplies of water in 1821, concluded by recommending a consolidation of the several trusts; but excepting that the competition between them has

abated, the expense and waste of separate establishments is still continued, and beyond this the expense of the fixed capital and establishment, charged upon perhaps one-third of the proper supply of water.

The private companies are also complained of as being practically irresponsible and arbitrary, and unaccommodating towards individuals. It is a further subject of complaint, as respects supplies by such companies, that they are directed almost exclusively to the supplies of such private houses as can pay water rates; that they are not arranged for the important objects of cleansing the streets or drains, or of supplying water in case of fire.

There appears to be no reason to doubt that the mode of supplying water to Bath, and gas to the town of Manchester, might be generally adopted in supplying water to the population. In order to get an efficient water supply, powers would be required to enter into the lands adjacent to towns, on a reasonable compensation to the owners, to obtain supplies of water; and, as the management of waterworks requires appropriate skill, it would be necessary to appoint an officer with special qualifications for their superintendence. Ordinary service may be obtained for the public, if recourse be had to the ordinary motives by which such service is engaged in private companies. It is not mentioned invidiously, but as a matter of fact, that the majority, not to say the whole, of such undertakings, by joint stock companies, are, in the first instance, moved by a solicitor, or engineer, or

other person, for the sake of the office of manager of the works, and that the directors and shareholders, and the inducement of profit to them, through the benefit undoubtedly to the public, are only the machinery to the attainment of the object for which the undertaking is primarily moved. If competent officers be appointed, and adequately remunerated for the service, there can be little doubt that the public may be saved the expense of the management by the occasional attendance of unskilled directors, and that they may save the expense of dividends, or apply the profits to public improvements, and moreover avoid the inconveniences and obstructions undoubtedly belonging to the supply of a commodity so essential to the public health, comfort, and economy by a private monopoly. Bad supplies of water would generally be less tolerated by the influential inhabitants of all places from a public municipal agency than from a private company.

The queries transmitted to the medical officers were directed to ascertain the sufficiency of the supplies for the purpose of cleansing, but the returns frequently advert to the bad effect of inferior supplies upon the health of the population : and it is scarcely conceivable to what filthy water, by custom, reconciles the people. Yet water containing animal matter, which is the most feared, appears to be less frequently injurious than that which is the clearest, namely, spring water, from the latter being oftener impregnated with mineral substances ; but there are instances of ill-health produced by both descriptions of water. The beneficial

effects derived from care as to the qualities of the water are now proved in the navy, where fatal dysentery formerly prevailed to an immense extent, in consequence of the impure and putrid state of the supplies; and care is now generally exercised on the subject by the medical officers of the army.

In the Metropolis the public owes the analysis of the supplies of water, and some improvement of supplies not in their nature essentially bad, chiefly to the stirring of speculators in rival companies. But the population of the rural districts, and of the smaller towns, afford no means for the payment of companies, still less any field for pecuniary competition.

The middle classes are exposed to the like inconveniences, and put up with very inferior water, whilst supplies of a salubrious quality might be obtained by extended public arrangements for the common benefit.

It will not be deemed necessary to attempt to develop all the considerations applicable to the subject; but there is wide foundation for the complaint that proper supplies of water to large portions of the community are extensively wanting; that those obtained are frequently of inferior quality—that they are commonly obtained at the greatest expense when obtained by hand labour—that the supplies by private companies, though cheaper and better, are defective, and chiefly restricted to the use of the higher and middle classes, unless in such inconvenient modes (*i.e.*, by cocks in courts), as seriously to impede the

growth of habits of cleanliness among the working classes. To which may be added, as the expression of an opinion founded on communications from all parts of the kingdom, that as a highly important sanitary measure connected with any general building regulations, whether for villages or for any class of towns, arrangements should be made for all houses to be supplied with good water, and should be prescribed as being as essential to cleanliness and health as the possession of a roof or of due space; that for this purpose, and in places where the supplies are not at present satisfactory, power should be vested in the most eligible local administrative body, which will generally be found to be that having charge of cleansing and structural arrangements, to procure proper supplies for the cleansing of the streets, for sewerage, for protection against fires, as well as for domestic use.

By recent legislation some of the suggestions contained in the above observations have been carried out. But although they were written forty-six years ago, there are still extant very grave defects on the matter of water supply for the people.

One attendant evil of the common methods of supply by companies for a trading profit is that they usually have no effectual control or interest in exercising any supervision over the distributary apparatus, or the care of the closets, or the prevention of waste. The consequence is that the waste is immense. In London it amounts to three-fifths of the water dis-

tributed. In London the quantity distributed on the intermittent system of supply is thirty-two gallons per head of the population. At Amsterdam the supply is only ten gallons per head, public consumers excepted. It is true only a small part of that city is water-closeted, but if each house were so treated it should only add one gallon per head to the existing consumption. There is this result from the waste of water in London, that the surplus fouled water permeates through bad house drains and sewers, and super-saturates the subsoils and creates marshy sites. In instances where the supplies have been placed with the whole of the distributary apparatus on a public footing, and the waste effectually reduced, there has been, attendant upon the reduction of the damp in houses, as at Liverpool, a marked reduction of the sickness and death-rates. It has been stated to me that in one town, the wells having become excessively polluted, recourse was had to a pipe-water supply; but as no measures had been taken for the removal of the water and the prevention of waste, and the drawing from the wells—which previously had lowered the water-level beneath the sites—having ceased, the water-level rose, and so, with the waste of the new pipe-water supplies, the site was made a swamp, and the whole town was put in a worse sanitary condition than before. The effect of the better drinking water was counteracted by the excess of damp from the fouled water.

On such and other experiences it results as a sanitary axiom, that the duty of carrying fouled water *out* of houses, and *out* of towns, clear of the sites, constantly through self-cleansing channels, should, with the duty of carrying water *into* houses, devolve upon one and the same authority, and that such authority should be a competent and responsible public one. We have numerous satisfactory instances, chiefly in small towns, of the working of this principle of sanitary administration, where the service of taking out the water as well as of taking it on to the land, has been extended to the application of the sewage to agricultural production, so that there is no stagnation either of the fresh water, or the fouled water, or the sewage applied to the land. Nature abhors stagnation! Our first great object of getting potable water for villages and towns for the sake of health and temperance, is indeed combined with the means of getting well-collected and well-distributed—water—for the great sanitary objects: clean persons, clean habitations, and clean air.

I will offer here a summary statement of the general conclusions to which sanitary science has, I consider, arrived in England, for the extension of improved supplies of potable water. The first is, the improvement of machinery and methods of distribution, by connecting the house service pipes with the street mains as parts of *one* system, and that a public one, responsible for the removal of all conditions of stagnation, as in cisterns, by which the *best* supplies

are made bad, and *bad* supplies are made worse. The second is, that the service of carrying in pure potable water shall be united with the duty of immediately carrying away fouled water, and preventing its stagnation by its removal, through self-cleansing drains and sewers, and its application direct to the land. The third regards the sources of supply, abandoning as soon as possible *river* sources containing, besides the sewage of towns, the surface washing of lands, especially highly-manured lands, and substituting, by preference, supplies from *spring* sources, or sources derived from primitive rocks, or clean surfaces; or, where good natural springs are not within reach, by creating artificial ones.

On the controversies as to the eligible qualities of water, I may say that observations of the effects of different sorts of water upon individuals are perplexed by idiosyncrasies. But we may clearly see the results on classes of people under similar conditions. Thus, in a prison supplied with the sewer-tainted water of the river Thames, cases of typhoid fever were frequent. The sources of supply were changed to spring sources, and fever almost entirely disappeared, and there was a marked advance in the general health. In one prison there was an outbreak of diarrhœa, such as prevailed regularly amongst the outside population. Accidental contamination of the water in the prison cistern with sewage gas was detected. When that was prevented,

health was restored. In one prison, cases of goitre appeared. They were suspected to be due to the water. The water was changed, and cases of goitre ceased.

The most important collective test as to the value of pure water supplies is found on board our steamships of war. All these are now supplied with water distilled from sea-water duly aërated. As compared with the supplies obtained from the common sources of potable water got from shore, this supply is considered greatly superior, and is a great sanitary boon. There is no doubt that the superior quality of the water thus supplied to the Royal Navy is one of the chief factors in contributing to the greater healthiness of the sailors of the Royal Navy over those employed in the mercantile marine.

VALUE OF SOFT WATER.

Pure soft water is, I believe, of so much value, that in the chalk districts, or in other districts where it is not to be got, it is worth while to prepare roofs expressly to catch it, and underground tanks to preserve it pure. In Britain it is estimated that the average quantity of rain water which falls on a square yard of surface in a year is 126 gallons. Three yards would give rather more than a gallon a day; or a surface of 100 yards would give 12,600 gallons, or 34 gallons per diem, or about $6\frac{1}{2}$ gallons per head to an average family of five. If this were insufficient for the purpose of the household it would be worth while reserving it for drinking and for washing the person, and the more special uses.

The collection of the rain water is one important use of a flat roof, properly prepared by an impermeable surface of hard tile or other material to which access may be had for cleansing it from soot or birds' dung before any coming rainfall, of which the first should be allowed to run to waste. A deep underground covered tank—for which concrete faced with impermeable earthenware tiles are the best materials—should be prepared to receive it, and keep it cool, and out of the way of any floating cause of impurity. The best trainers of racing horses in England are very careful to do all this for their horses, and even to have water carried with them for the use of the horses at races. Mr. Bateman has calculated that an ample supply of soft water might be brought from the Welsh mountains to London at a cost of six shillings per head per annum. Our estimate in the Board of Health was less than this. We found that upwards of forty-six million gallons of soft perennial spring water of superior quality, free from taint of peat and well aerated, might be had within the then existing charges.

This is a matter still waiting for accomplishment, and only waiting, for the supply is at our very doors.

The deeper the filtration through natural strata, such as those of the chalk formation, the more perfect the precipitation. But then the deeper those sources are, the greater usually are the mineral impregnations in water. Now every grain of chalk in water reduces its soluble action on food, as well as for other purposes. We have had evidence that


persons accustomed to soft water become dyspeptic when removing to hard water districts. Animals, horses particularly, are frequently much affected by the change.

THE ARTIFICIAL SOFTENING OF WATER.

By a process called "Clarke's process," of adding lime in order to precipitate lime, which has been greatly improved, we can now reduce the quantity of suspended chalk from sixteen or eighteen grains, or degrees of hardness, as it is called, to between two and four degrees of hardness. The process has been carried on in some very successful instances, on a sufficiently large scale to prove its extensive applicability. Mr. Bateman, an engineer, who has conducted some extensive works for bringing in soft water chiefly from the surface washings of granite or strata of the primitive formations, observed to me, that in one instance where he had applied this "Clarke's process," he considered the water obtained to be about as good as his Loch Katrine water,—a water of some two degrees of hardness; but I venture to believe that water so softened is better than the Loch Katrine water, delivered with its "wood lice," generated in the lake, or than water derived from the surface washings of granite, in times of storm containing infusions of peat, which do not agree with the dyspeptic.

CHAPTER IV.

THE DRAINAGE OF THE DWELLING HOUSE.

ONNECTED with the water supply of the dwelling house, and forming, in point of fact, the completion of it, is the subject of the drainage of the house. We assume that water has been brought into the dwelling, has served its purpose there, and, with the sewage, has to be disposed of by what is called the drain. How shall the drainage be best carried out?

HOUSE DRAINAGE IN BOSTON CITY.

I have a report from the city of Boston, United States, where, as respects the general system of town sewerage, the citizens have fallen into the enormously wasteful error of the combined system, in which, not only the water which has been used in the house for domestic purposes, but the water from rain and storm is also admixed with the sewage. This same error has befallen our metropolis and other places, with the additional error of throwing the sewage, and, it may be added, the milk from many thousand cows, into the sea. Nevertheless, chiefly by sanitary house inspection, an important advance has

been made; and a former death-rate of 31·80 per 1,000 has been reduced to 23·53, and in 1879 to 20·83 per 1,000.

The *Times* has rendered important sanitary service by calling attention to the first object of urban sanitation—the drainage of the house. I wish to present the example of the way in which the Board of Health of Boston acted against that defect. They state in their last report: “In 1877 we commenced examining houses from door to door, without any reference to any complaint or supposed defect in the sanitary arrangements; taking every house in the block and selecting the blocks in different sections of the city.” Let this course of action be noted.

Our practice is now of urging the occupiers of houses to send for some private specialist to examine their houses, and, of course, pay him a fee. But the danger is not unfrequently in the next house, and, therefore, not traced out by the inspector. I nevertheless considered even the expense of the visit of the specialist, and also of the separate works he may recommend, to be means of important economy. I mention the expense, however, as a potent obstruction. It appears that in the first year of the operations in Boston the percentage of defective house drains was 55, and of defective trapping 78. In the last year the percentage of bad house drains was reduced to 34, and defective trapping to 28 only. I believe that similar results would be obtained by the same kind of inspectors in London.

I note as an example of the working of the house-to-house examination in Boston, that out of 306 houses examined by the inspectors last year, bad odours were found in 180; defective drains in 166; defective trapping in 174; water-closets in 295; offensive water-closets in 47; privy-vaults in 43; "air-boxes" in 167; air-boxes improperly arranged, 4; offensive vaults, 21; damp or unclean yards, 8.

HOUSE DRAINAGE IN LONDON.

This enumeration of defects, according to recent evidence, would represent the common hazards—in great part entirely unknown to him or the owner,—in which, as a tenant, a man would take a house in a large part of London. It has been declared upon examination, that not above one out of three first-class houses have been found to be safely drained. Fevers amongst servants and bad drainage have prevailed in Belgravia as well as Bethnal Green. The people of Boston appear to regard the good sanitary condition of each other's houses and the prevention of the pollution of the common air as a subject of a common interest, to be provided for under common contract; and, in doing so, I can state that they will get the work done at once, and done responsibly, and maintained in good condition, generally at one-third the cost that it is or can be done separately by the private householder who employs his own plumber or architect.

This is opposed to trading interests, which local

boards here commonly think it their duty to protect. I may, however, question the right of plumbers to sanitary work. Constant supplies of water, water-closets, and tubular drains are, I expect, not to be found in "Old London." The plumbers will possibly, however, have large and new work offered to them by common contracts, on competition for new districts.

The board at Boston recite as their work for last year nine thousand pieces of work of the sanitation of houses, including the reparation of nearly three thousand private house drains. They state in their report that the subject of house draining has been pursued by the board during the last year with the same interest as heretofore, and they have been greatly encouraged by the active interest shown in it by the people. They further observe:—"A very decided change of opinion is manifested everywhere on this subject, and it becomes easier every year to convince people and obtain the desired improvements in house drainage.

IMMEDIATE AND CONSTANT DRAINAGE OF THE HOUSE.

The immediate removal of excreta, and putrescible excreta, before putrefaction commences, which is usually in one, two, or three days, is a primary condition of sanitation. The practical effect of the immediate removal from within the house of sewage before it enters into putrefactive decomposition is shown in this: that when such sewage arrives at outfalls into streams it feeds fishes, whereas in putre-

factive stages it kills them. Putrefaction means infection ; and the immediate discharge by water carriage is disinfection. But the condition of stagnation and the putridity of sewage is now commonly assumed to be a constant unavoidable condition ; and hence immensely expensive schemes of disinfection continue to be propounded. My friend, the late General Scott, estimated that he could disinfect the sewage of the metropolis for £100,000 per annum. I doubt if he could have done it for that, but if he could, that sum capitalised at the usual rate would suffice for the provision of self-cleansing drains for all the houses needing them, and for preventing the noxious condition of putridity. Moreover, putridity is a waste of manure, which disinfectants do little to prevent.

FOUL SMELLS.

Where you meet foul smells, you may say, “ Here is a waste of precious manure.” At our Board of Health we got a consolidation of the eight separate Sewers Commissions under unity for the whole of the metropolis. We then got from that consolidated commission—what no separate commission could have got—an Ordnance Survey for the whole of the Metropolis, on such a scale as to admit of the course of the capillaries, or house drains, within the houses to be seen for the purposes of inspection. I was then enabled to get, what the separate commissions would not have got, even if they had sufficient sanitary science to move them thereto, an elaborate set of

trial works to determine the sizes of house drains and sewers that would be self-cleansing.

I can state that were the complete sanitation of houses by constant supplies of water, and removal of fouled water and fæcal matter by water carriage effected, the former expenses under the First Board of Health would have been greatly below the minimum charges against preventable disease. Those expenses did not, when properly executed, exceed threepence-halfpenny per week, payable not by the owner, but by the occupier, who received the benefit, which was equal to a reduction of a weekly insurance charge of one shilling and sixpence off an allowance of ten shillings a week during sickness. The cost of labour in works since then may have advanced, but, nevertheless, the complete works will be found to effect an important reduction of insurance charges to the occupier, as well as a reduction of other charges to the owner.

SIZE OF DRAINS AND SEWERS.

If tubular earthenware pipes were made perfectly true as is a gun-barrel, drains of 3in. of diameter, with a fall of little more than 1 in 60, would be self-cleansing, and quite sufficient for the ordinary house. As to sewers, a pipe of 15 in. in diameter was placed in an old sewer with a sectional area of 15ft. to receive storm water, and the drainage from 1,200 average-sized houses. In that sewer the deposit accumulated at the rate of 6,000 cubic feet per month,

but through a sewer pipe of 15in. in diameter, with somewhat less inclination, it was found that by the accelerated flow that smaller tube was kept perfectly clear of deposit. Bricks and rats were swept out of it by the force of the flow. It was found, moreover, that the separate house-drainage—apart from that of rain or storm water—would have passed through a 5in. tube, that is to say, of not one-third the minimum size of a single house drain, which had up to that time and upon the advice of architects been declared to be necessary for a single house, namely, one of not less than nine inches in diameter. Taking the sewer of one street as a fair example, Mr. Thomas Lovick, one of our engineers—now one of the chief engineers of the Metropolitan Board of Works—estimated that the whole of the separate house drainage of the metropolis—when there were three hundred and forty thousand houses—might have been carried away in a sewer of three feet in diameter.

In the United States one sanitary engineer at least, Colonel Waring, has paid attention to the sizes of sewers for self-cleansing action, and he has given one instance, that at the Grand Union Hotel at Saratoga, in which, with nineteen hundred people, some hundreds of water-closets, and the water supply as copious as possible, the amount of the full flow of sewage measured $4\frac{1}{2}$ inches in sectional area, and might have been discharged through a $2\frac{1}{2}$ inch pipe. The observations of the inspectors may be well directed

to the conditions of the self-cleansing power of these channels.

One condition has been subsequently shown, namely, that in a sewer of a proper capacity for the ordinary flow of house drainage alone the friction of the flow of water carries the air along with it—as Mr. Pilbrow has shown particularly at Tottenham—with a force sufficient to blow out a candle at the outlet. Instead of any emanations going up into the houses from that sewer, there is really a down-draft from the houses, the sewage being discharged constantly by self-cleansing drains from the houses, before putrefaction can commence. Surveyors in the towns so drained have declared to me that there is no smell of putrefaction created or perceptible, and that there is really no need of trapping except to guard against occasional stoppages, which do not amount to more than a dozen in a thousand houses.

SAMPLE TEST OF HOUSE DRAINS.

For the sake of the owners as well as of occupiers of houses, the result of the house drainage work may be tested by the sanitary inspector by the smoke test, or by the turpentine test; and, for the whole town, by seeing whether marked substances, like split turnips, put in the closets at the upper part, and timed, duly arrive at the outfall. Provision for flushing is needed to guard against accidents; provision for habitual flushing means habitual stagnation; rough brick drains and stone drains have now

generally been superseded by smooth tubular pot drains, but commonly with compromises of principle. "Not to go to extremes," larger than correct sizes are frequently used, to the extent of double, four, five, and six-inch drains, by which accidental stoppages are made frequent, the frictional area increased, and the flow retarded, where it ought to be most carefully accelerated, in the house drains. The ovoid form, which is proved to accelerate small flows, and is the best, has not yet got into proper use for all tubular drainage. The machine-made pipes are deficient in taper.

PROOFS OF GOOD HOUSE DRAINAGE.

My first question on visiting a town which has been completely house-drained and sewered on principle has generally been:—"Are the houses clear from smell?" The answer was usually, "Yes." "Are your sewers clear from smell?" "Yes." But I have met with some qualifications as to houses. There was one quarter which was not clear from smells. "How is that?" I asked. "Why, in that block the contractor did not do his work properly, and hence the failures and smells." In another place there was an exception of this sort—the contractor failed to execute his work properly; he jointed his pipes with clay instead of cement, and there the sewage escaped, with foul smells, and, consequently, fever. In one instance, I was informed, even by an engineer, that it was absolutely necessary that provision should be

made for the trapping and flushing, for the sewers undoubtedly emitted foul smells. I had inquiries made into the instance he gave me, when it turned out that the new pipe sewers had been connected with a set of old sewers of deposit, which the local board had not thought it worth while to replace by self-cleansing sewers, and the new and small sewers carried from the old ones their gases of stagnation and putrefaction.

In my own neighbourhood, a General of great distinction, a very robust person, died suddenly. My physician, who attended him, was confident that the death had occurred from an exposure to sewer gas. He examined the house, and found that such gas permeated a hollow wall close to the head of the bed. A new pipe sewer had been laid down, and was connected by a drain with the house at the top of the hill, where it had diffused foul smells never experienced there before, emanating from a connection made with the bad sewers of deposit and connections with old and badly-drained houses of a lower district. A proper sanitary inspection would have protected that and other houses, by trapping, from such lethal conditions, which the ignorant and dangerous local authority allowed to continue. Here there was certainly an augmentation of private insurance charges, which complete work would have reduced.

I might adduce varied examples of the need of an appeal to a central authority to enforce the repre-

sentations of the local officers for the protection of the people against the consequences of the ignorance of the local authorities. And, it may be stated, as a general sanitary rule, that the local administration, as well as the general administration, may be tested by the nose. The economical effect of all my experiences is that three houses and three towns might be drained well at the cost incurred for draining one house or one town ill. This general economic conclusion once excited furious opposition in the House of Commons, and obstruction to the renewal of the First Board of Health.

CHAPTER V.

REMOVAL OF SEWAGE FROM THE DWELLING HOUSE.

PERSONS who only know of sewage by their experience of its emanations, under the common conditions of stagnation and putrefaction, very naturally object to its application in the vicinity of their residences, and would do so with much reason if those conditions were essential. Violent opposition is made to the discharge of sewers into rivers, on the score of pollution. Whilst sewage, however, in the common condition of putrefaction, kills fish, sewage in another condition, that is to say, in circulation before putrefaction—feeds fish. But on the score of waste I object to its discharge into the rivers, or anywhere except on the land. People do not object to the cultivation of land, as market garden land, close to their dwellings or to towns. Nevertheless, culture and high farming are frequently conducted in a manner productive of noxious emanations that are injurious to health, and make the culture there a nuisance. This is done by heavy top dressings of what is called “town manure,” in the solid form, in which condition it remains stagnating until it is disintegrated by decomposition,

by which decomposition its fertilising power is diminished, and it is then carried down into the soil by the rain. The complete remedy of this evil is to liquefy the manure at once—to put it in solution, and apply it to the soil in doses proportioned to the soil's receptivity—in fact, to apply it as sewage, by which means one load of stable manure may be made to do the work of more than two. I was advised, when I looked into the subject, that the waste of the farmyard manures and other manures, by the methods the farmers used, was in extensive districts equivalent to another rental. On the other hand, applications of plain water in excess, by the method of submersion, creating marsh surfaces and marsh miasma, are often conducive to the rot in sheep and ague in men; and, of course, the distribution of sewage in the like manner would be productive of still worse results. At the irrigations at Paris, as I am informed, this danger has been incurred, through excessive submersion, by the unskilfulness of the small farmers to whom the sewage has been given, and that sewage not in the fresh state, but as sewage of a bad quality, as nearly all is in Paris.

The facts should be known that for sanitation it is a work of skill to avoid the supersaturation of the soil, and that for cultivation it is a work of skill to avoid supersaturation, and to adapt the supply of the liquid manure to the “hygroscopicity” of the soil, according to the periods of the growth of the plant for root, for wood, for leaf, or for fruit. For the avoidance of

stagnation and waste, and the expense of storage tanks, it is a work of skill to place every day's supply from the town on one part of the land or another, whatever be the weather, in frost or snow. In frost this has been accomplished at Dantzig by distribution under the ice.

Sewage farming is an art foreign to common agricultural practice, and is confined to a high order of horticulturists, growers of prize fruit, to whom its application on a large scale should be confided. Nevertheless, in some hundred of sewage farms now conducted throughout the country by all sorts of rudimentary methods, with bad sewage from ill-drained towns as well as good, and by various rudimentary workings, the superior productive power of the liquefied manure has been established, not only in the bulk, but in the quality of the produce ; and, as to the bulk, whilst the average yield of agriculture in England may be taken to be as one, and the market-gardening as about three and a half, the sewage-farm produce has been as five. It is found that, as a rule, the sewage of more than a hundred of population may be utilised in an acre.

As to the sanitary effect of sewage farming, the judges of the competition for prizes issued by the Royal Agricultural Society,—of which Mr. Baldwin Latham, Mr. Clare Sewell Read, and Mr. Thursfield were judges,—made particular inquiries about the sanitary results upon those engaged in the work, and they display these in a table of the death-rates. They

state that the rate of mortality on an average of the number of years which these farms have been in operation (ten) does not exceed more than three per thousand per annum; that is to say, on a population of 380 men living on or working on the farms, and 137 children. From the difference of working under insanitary conditions amidst stable-dung and farm-yard manures,—which are attended with fevers amongst families—and the working amidst liquefied manures, I should have expected a marked difference, but not so great as this, which must be about fourfold.

In order to secure the best results from the application of sewage to the land, its dilution must be no greater than actually necessary. The amount of water requisite for its carriage gives, in this climate at least, a fully sufficient dilution. Storm and subsoil water should therefore be excluded from the sewers, and should be provided for separately. Storm water is specially prejudicial to irrigation, as it always presents itself at the time when it is least wanted: during very wet weather. Moreover, the admission of storm and subsoil water greatly increases the difficulty of conveying the sewage to suitable land, by augmenting, in an irregular and uncontrollable manner, the bulk to be carried. Hence, to avoid the expense of pumping a greatly increased and varying amount of sewage, attempts to apply it have often been limited to areas to which it could flow by gravitation, or nearly so, where the soil and situation were unfavourable, or where, on account of its contiguity to the town, or

from other causes, the cost of land has been excessive, and where, therefore, the extent of ground has been prejudicially restricted.

By limiting the quantity to be dealt with to the sewage proper, the choice of site for its application, both as to position and extent, is greatly increased. It should be remembered that the cost of raising a given quantity of water does not increase directly as the height to which it is lifted, the efficiency of pumping machinery for high lifts being generally greater than of that for low lifts. In favourable cases, as in large waterworks' steam-engines, 80,000 gallons can be pumped to a height of 100 feet for one shilling. When, therefore, a calculable and comparatively constant quantity of sewage has to be raised, as will be the case where storm and subsoil water is excluded, the cost of pumping need not be feared, when by its means favourable sites for sewage applications may be commanded.

A competent administration will utilise the ground allotted to, or contiguous to, public institutions, such as union houses, prisons, and others, and develop models of liquefied manure cultivation.

On the difficulty which presented itself for the completion of the system of circulation by the disposal of town sewage by surface irrigation near towns, particularly of sewage in the condition of putridity, in which all was then only to be met with, I was led to consider subsoil or subterranean irrigation, and I got several friends who had gardens to try it, and the

trials were very promising. Sir Joseph Paxton promised to try it systematically. But it was tried independently and systematically on a large scale by M. Charpentier, a French vine-grower, near Bordeaux, with whom I had correspondence on the subject. His trials were not with town sewage, but with liquefied manure, and included the old Italian method of distribution by regurgitation, and certainly the results he obtained with vines and fruits, as well as with market garden produce, were most satisfactory. He contended for its superiority over surface irrigation, but it required great skill, and more capital than the ordinary surface irrigations. The early successes with surface distributions, however, withdrew my attention from it ; but the method has been revived with success by Mr. Rogers Field in the disposal of the sewage of some villages ; and his flushing tank greatly facilitates distribution by that subterranean method. It has also been carried out, as reported, with marked success by Colonel Waring, in America. Experiences show that for high culture, for model gardens near towns, for deep-feeding plants, for fruit-trees, and for arboriculture generally and in hot climates, the method in skilful hands will be productive of very great results.


UTILISATION OF CANALS FOR CONVEYANCE OF SEWAGE.

For the application of sewage to agricultural production, I have made varied trials. In one I proposed to utilise canals for irrigation with liquefied manure.

I got a small steamboat of 10-horse power, with a hose a thousand yards long, and carried some night-soil in a tender on the Bridgewater Canal. The liquefied night-soil was pumped through the hose on to the adjacent lands of those who would try it. The success was complete as to the power of the liquefied manure, and the cheapness of its distribution, by means of hose and jet, as compared with the cost of the distribution of solid manures with the cart. But the farmers who could be got to try the liquid manure were far distant from each other, and the supplies small. The only means of success appeared to be to take a farm adjacent to the canal, and devote the entire service to it. But for that I had neither time nor capital to spare. I proposed a plan of taking the horse into the boat and making the horse work it on a horse-power platform and by a screw propeller. When the boat was stopped the horse-power was to be used for pumping, and for distribution through the hose on to the land. The plan has been proposed for the utilisation of the deserted canals of France for the purpose of irrigation.

CHAPTER VI.

DETACHED DWELLINGS AND GARDEN ROOFS.

ONCEDING the economical advantages of four-tenemented houses over the house rows or the street, I should yet advise to proprietors in rural districts the construction of completely detached dwellings as having considerable social advantages. The lower we descend in the social scale, the less is the self-restraint, the greater the passion and violence, and the greater the need of a certain extent of separation. In blocks of four contiguous houses, one morose owner, one shrew or "common scold," or one set of ill-conditioned children, from whom there is no power of escape, may render the habitation and the ownership of the other three almost valueless. I do not know how this may be or how it is provided against at Mulhouse. But experience in penal administration shows that too close aggregations of ill-trained people frequently work badly in England, and how important is the power of ejection and freedom of change of occupancy.

A magistrate's clerk of great experience in the city of London once observed to me that in rebuilding a city, the architect should, for social reasons

be prevented making close courts or alleys with common pumps. When the rooms in close places overlooked the opposite rooms, the female occupiers were apt to put about offensive tales and criticisms on what went on in each other's rooms, which ended in fierce quarrels and assaults. One or two common pumps almost kept two low attorneys, the sequence being this:—A little girl going to fetch water was thrust aside by a big girl, and being saucy was beaten by the big girl; then the mother of the little girl came out and straightway beat the big girl;—then the mother of the big girl came out and straightway attacked the mother of the little girl;—then the husbands came forth to do battle for their wives and children, and then, usually with the Irish, sides were taken by the other occupiers of the court, and there was a “battle royal.” Afterwards came prosecutions for assault before the magistrates, and the work for the attorneys.


One owner of a close square of buildings told me that he found it necessary to make two entrances to it, so that people in feud might avoid meeting each other. Precautions are necessary to prevent people coming too close to each other, and jostling each other, for if they jostle each other they hate each other. I regret to say that, according to my observation, in our own country, the great Christian precept, “Love thy neighbour as thyself,” has yet to be made completely prevalent amongst people of high as well as of low degree. As a minor illustration of too close contiguity, a proprietor stated to me that he found that he had made a great

mistake in building cottages in rows with the doors contiguous to each other, as he observed the women in constant idle gossip with each other. This will be observed in streets with one side of the street with contiguous doors and the other with separate doors. Even middle-class houses, the semi-detached, by which the speculative builder saves a wall and a yard of space between the two houses, are found to be productive of discomfort in other ways than the noise through the walls; the higher rents are given for dwellings with the same internal space, but completely detached.

Where ground space is dear, as it is with the dwellings of the labouring classes in town, there is good reason for utilising the roof space. It serves as an additional drying-ground. In dry weather it may be used for the children to play on. One example has been set in London, where, in a densely crowded neighbourhood, there being no playground for a boys' school, they have made one for them on the flat roof. If any one will look over the *cité ouvrière* of Mulhouse, it will be seen what a large amount of roof space is lost; and yet the cost of the weather-tight flat roof of concrete or hollow brick is nearly a third less in England than the timber-slate, or tile roof. Its greatest convenience or use, however, would be for self-contained dwellings; on it the father of the family may sit in fine weather, and have better air and an extended prospect, and enjoy himself in the Oriental fashion.

CHAPTER VII.

THE OVER-CROWDED DWELLING HOUSE.

T would require much time and various opportunities of observation to attempt to make an exact analysis of the combined causes, and an estimate of the effect of each separate cause which operates to produce the masses of moral and physical wretchedness met with in the investigation of the condition of the lowest population. But several separate circumstances have each its separate moral as well as physical influence. Thus tenements of inferior construction have manifestly an injurious operation on the moral as well as on the sanitary condition, independently of any overcrowding. For example, in my early official inquiries it appeared to be matter of common observation, in the instance of migrant families of workpeople, who are obliged to occupy inferior tenements, that their habits soon become "of a piece" with the dwelling. A gentleman who had observed closely the condition of the workpeople in the south of Cheshire and the north of Lancashire, men of similar race and education, working at the same description of work, namely, as cotton spinners,—mill hands,—and earning nearly the

same amount of wages, stated that the workmen of the north of Lancashire are obviously inferior to those in the south of Cheshire, in health and habits of personal cleanliness and general condition. The difference is traced mainly to the circumstance that the labourers in the north of Lancashire inhabit stone houses of a description that absorbs moisture, the dampness of which affects the health, and causes personal uncleanness, induced by the difficulty of keeping a clean house. The operation of the same deteriorating influences was also observable in Scotland, and may be illustrated by several instances met with in the course of inquiries.

One of the circumstances most favourable to the condition of an artisan or an agricultural labourer, is his obtaining as a wife a female who has had a good industrial training in the well-regulated household of persons of a higher condition. The following instance of the effect of the dwelling itself on the condition of female servants when married was brought to notice by a member of the family in which they had been brought up. One was of a young woman who had been taught the habits of neatness, order, and cleanliness most thoroughly as household work.

“Her attention to personal neatness,” says a lady, who was the informant, “was very great; her face seemed always as if it were just washed, and with her bright hair neatly combed underneath her snow-white cap, a smooth white apron, and her gown and handkerchief carefully put on, she used to look very

comely. After a year or two she married the serving man, who, as he was retained in his situation, was obliged to take a house as near his place as possible. The cottages in the neighbourhood were of the most wretched kind, mere hovels built of rough stones and covered with ragged thatch; there were few even of these, so there was no choice, and they were obliged to be content with the first that was vacant, which was in the most retired situation. After they had been married about two years, I happened to be walking past one of these miserable cottages, and as the door was open, I had the curiosity to enter. I found it was the home of the servant I have been describing. But what a change had come over her! Her face was dirty, and her tangled hair hung over her eyes. Her cap, though of good materials, was ill-washed and slovenly put on. Her whole dress, though apparently good and serviceable, was very untidy, and looked dirty and slatternly; everything indeed about her seemed wretched and neglected (except her little child), and she appeared very discontented. She seemed aware of the change there must be in her appearance since I had last seen her, for she immediately began to complain of her house. The wet came in at the door of the *only room*, and when it rained, through every part of the roof also, except just over the hearthstone; large drops fell upon her as she lay in bed, or as she was working at the window; in short, she had found it impossible to keep things in order, so had gradually ceased to

make any exertions. Her condition had been borne down by the condition of the house. Then her husband was dissatisfied with his home and with her; his visits became less frequent, and if he had been a day labourer, and there had been a beer-shop or a public-house, the preference of that to his home would have been inevitable, and would have presented in this one instance an example of a multitude of cases.

“She was afterwards, however, removed to a new cottage, which was water-tight, and had some conveniences, and was built close to the road, which her former mistress and all her friends must constantly pass along. She soon resumed, in a great degree, her former good habits, but still there was a little of the *dawdle* left about her; the remains of the dispiritedness caused by her former very unfavourable circumstances.”

In some other dwellings not far from the one above described, another instance of a female who had been brought up as a servant in a well-ordered house, and who, for her station, had received a very excellent religious and moral education, presented itself. Before her marriage she had been distinguished for the refinement with which she sang national airs, and for her knowledge of the Bible and of the doctrines of her Church. Her personal condition had become “a piece” with the wretched stone undrained hovel, with a pigsty before it, into which she had been taken. She was found with rings of

dirt about her neck, and turning over with dirty hands Brown's Dictionary, to see whether the newly-elected minister was "sound" in his doctrine. In this case, no moral lapse was obvious, but the children were apparently brought up under great disadvantages.

There, however, as in most cases, the internal economy of the houses was primarily affected by the defective internal and surrounding drainage that produced damp and wet, and thence the dirt against which the inmates had ceased to contend. On inquiry of the male labourers in the district, it appeared that almost every third man was subjected to rheumatism; and with them, it was evident that the prevalence of damp and marsh miasma from the want of drainage, if it did not necessitate, formed a strong temptation to, the use of ardent spirits. With them as with the females, the wretched condition of the tenement formed a strong barrier against personal cleanliness and the use of decent clothes. In the rural districts the very defects of the cottages which let in the fresh air, in spite of all the efforts of the inmates to exclude it, often obviate the effects of the overcrowding and defective ventilation. It has been observed, that while the labouring population of several districts have had no shelter but huts, similar to those described by Dr. Gilly as the habitations of the Border peasantry, which afforded a free passage for currents of air, they were not subject to fevers, though they were to rheumatism; but when,

through the good intentions of the proprietors, such habitations were provided as were deemed more comfortable from excluding the weather effectually, but which from the neglect of ventilation afforded recesses for stagnating air and impurities which they had not the means, or had not a sufficient love of cleanliness, to remove, though rheumatism was excluded, febrile infection was generated. In the towns the access of the wind is impeded by the closeness of the surrounding habitations, and the internal construction of the dwellings tends to exclude the air still more effectually. Were the closed windows opened, it would be frequently only to admit a worse compound—the air from neglected privies, and the miasma from the wet and undrained court or street.

The close pent-up air in these abodes has, undoubtedly, a depressing effect on the nervous energies, and this again, with the uneducated, and, indeed, with many of the educated workpeople, has an effect on the moral habits by acting as a strong and often irresistible provocative to the use of fermented liquors and ardent spirits. Much may be due to the incitement of association of greater numbers of people, but it is a common fact that the same workpeople indulge more in drink when living in the close courts and lanes of the town than when living in the country, and that the residence in the different places is attended with a difference of effects similar to those described in respect to the tailors working in crowded rooms in towns, and the tailors working separately or

in the country. The workpeople who have fallen into habits of drinking, strenuously allege the impossibility of avoiding the practice in such places; they do, however, drink in greater quantities in such places, and give increased effect to the noxious miasma by which they are surrounded.

Some inquiries from Mr. Liddle, the medical officer of the Whitechapel Union, as to the condition of the workpeople he visited in such places as he has described, brought to notice another indirect effect of the external as well as the internal condition of the dwelling on their domestic economy and general condition.

It appeared that the persons whom he visited for the purpose of administering medical relief were men earning, when in work, from sixteen to twenty shillings per week, the women earning proportionably. Yet whenever they were subjected to the frequent attacks of sickness which prevailed amongst them, they were in the most wretched destitution; the house was bare of everything; they had no provisions and no credit, and their need for relief was most imminent. In answer to the inquiry how this was to be accounted for, inasmuch as with agricultural labourers who earned little more than half that sum, and paid nearly as much for their food, in visiting their cottages with their ministers, there was commonly some store of provisions to be observed, Mr. Liddle stated that in such places as those in his district, in such atmospheres, a store of provisions would not keep; everything decayed rapidly, and the

workpeople consequently lived "from hand to mouth." On inquiring as to this fact from a respectable butcher, accustomed to selling meat to persons living in such situations, he stated that "meat sold on a Saturday night, in hot weather, to poor people, who have only one close room, in which they sleep and live and cook, will certainly turn before the Sunday morning; when, if it were kept in the butcher's shop, or in a well-ventilated place, it would be in as good a condition on the Monday morning. There is a great deal of loss of meat in consequence of the want of ventilation and bad condition of the dwellings of the poorer classes. The butter kept in such places sooner becomes rancid, and the bread dry and disagreeable."

Here, then, we have from the one agent, a close and polluted atmosphere, two different sets of effects; the one set engendering improvidence, expense, and waste; the other, the depressing effects of external and internal miasma on the nervous system, tending to incite the habitual use of ardent spirits; and both tending to precipitate this population into disease and misery.

The familiarity with the sickness and death constantly present in the crowded and unwholesome districts, appears to react as another concurrent cause in aggravation of the wretchedness and vice in which the poor are plunged. Seeing the apparent uncertainty of the morrow, the inhabitants really take no heed of it, and abandon themselves with the recklessness and avidity of common soldiers in a war

to whatever gross enjoyment comes within their reach. All the districts visited, where the rate of sickness and mortality was high, presented, as might be expected, a proportionate amount of severe cases of destitute orphanage and widowhood, and the same places were marked by excessive recklessness of the labouring population. In Dumfries, for example, it is estimated that the cholera swept away one-eleventh part of the population. Until recently, the town had not recovered the severe effects of the visitation, and the condition of the orphans was most deplorable. Amongst young artisans, who were earning from sixteen to eighteen shillings a week, there were very few who made any reserves against the casualties of sickness. The provost was asked what number of bakers' shops there were? "Twelve," was his answer. "And what number of whisky-shops may the town possess?" "Seventy-nine," was the reply. If we might rely on the inquiries made of working men in the wynds of Edinburgh, their consumption of spirits bore almost the like proportion to the consumption of wholesome food.

Captain Stuart, the superintendent of the police, stated that a man had been executed at Edinburgh for the murder of his wife in a fit of passion, in the very room the commissioners had accidentally entered, and where they were led to make the observations. At a short distance from that spot, and amidst others of this class of habitation, were those which had been the scenes of the murders

by Burke and Hare. Yet amidst these were the residences of working men engaged in regular industry.

The indiscriminate mixture of workpeople and their children in the immediate vicinity and often in the same rooms with persons whose character was denoted by the question and answer more than once exchanged, "When were you last washed?" "When I was last in prison," was only one mark of the entire degradation to which they had been brought. The working classes living in these districts were equally marked by the abandonment of every civil or social regulation. Asking some children in one of the rooms of the wynds in which they swarmed in Glasgow, what were their names, they hesitated to answer, when one of the inmates said they called them —, mentioning some nicknames.

"The fact is," observed Captain Miller, superintendent of police, "they really have no names." Within this range of buildings I have no doubt I should have been able to find a thousand children who have no names whatever, or only nicknames, like dogs. There were found, amidst the occupants, labourers earning wages undoubtedly sufficient to have paid for comfortable tenements, men and women who were intelligent, and, so far as could be ascertained, had received the ordinary education which should have given better tastes, and led to better habits. My own observations have been confirmed by the statement of Mr. Sheriff Alison, of Glasgow,*

* Afterwards Sir Archibald Alison, Bart.

that in the manufacturing towns of Scotland, "in the contest with whisky, in their crowded population, education has been entirely overthrown." The ministers make similar reports from the rural districts.


On observation of other districts, and comparison of the habits of the same workmen in the town and country, it will be seen that I consider that the use of the whisky and the prostration of the education and moral habits for which the Scottish labourers have been distinguished, is, to a considerable extent, attributable to the surrounding physical circumstances, including the effects of the bad ventilation. The labourers presented to our notice in the condition described were almost all Scotch. It is common to ascribe the extreme of misery and vice wholly to the Irish portion of the population of the towns in Scotland. A short inspection on the spot would correct this error. Mr. Baird, in his report on the sanitary condition of the poor of Glasgow, observes that "the bad name of the poor Irish had been too long attached to them."

Dr. Cowan, of Glasgow, stated that "from ample opportunities of observation, the Irish appeared to him to exhibit much less of that squalid misery and addiction to the use of ardent spirits than the Scotch of the same grade." Instances were indeed stated where the Irish were preferred for employment from their superior steadiness and docility; and Mr. Stuart, the Factory Inspector for Scotland, stated that "instances are now occurring of a preference

being given to them as workers in the flax factories on account of their regular habits, and that very significant hints have been given by extensive factory owners, that Irish workmen will be selected unless the natives of the place, and other persons employed by them, relinquish the prevailing habits of intemperance." Dr. Scott Alison, in his report on Tranent, has described the population in receipt of high wages, but living under similar influences, as prone to passionate excitement, and as apt instruments for political discontents; their moral perceptions appeared to have been obliterated, and they may be said to be characterised by a "ferocious indocility which makes them prompt to wrong and violence, destroys their social nature, and transforms them into something little better than wild beasts." It is to be regretted that the coincidence of pestilence and moral disorder is not confined to one part of the island, nor to any one race of the population. The overcrowding and the removal of what may be termed the architectural barriers or protections of decency and propriety, and the causes of physical deterioration in connection with moral deterioration, are also fearfully manifest in the districts in England, which, at the time to which the evidence refers, were in a state of prosperity.

CHAPTER VIII.

THE ECONOMY OF GOOD DWELLING HOUSES.

HE mode by which the condition of the dwellings of the labouring classes was originally and most extensively deteriorated in England was by the facility afforded to owners of cottage tenements, usually when acting as administrators of the poor law, to get their own tenants excused from the payment of rates. The legal ground for exemption was, not the value of the tenement, but the destitution or inability of the tenant to pay; but inasmuch as the occupation of a well-conditioned tenement, or of a tenement in advance of others, would be popularly considered *primâ facie* evidence of ability to pay rates, the cottage speculator would not be at the expense to present evidence against the exemption by which he would gain. The general tenor of the evidence is, that the exempted tenements were of a very inferior order, and that the rents collected for them are exorbitant, and such as ought to have ensured tenements of a higher quality.

Such residences appear to come in competition very rarely, and, viewed with reference to the place of work, the habitations of the labouring classes in the

manufacturing towns extensively partook of the nature of monopolies, and hence the landlord was enabled to exact a price for position, independently of the character or quality of the building, or of the extent of outlay upon it. Where there was any choice, the labouring classes were generally attracted to these tenements by the promise of exemption from the payment of poor's rates, and were deluded into the payment of a proportionately higher rent.

The mischievous effect of exemptions from rating on the ground of poverty, in bringing down buildings to the exempted scale, and in preventing advances beyond it, was strikingly displayed in Ireland, where all houses not exceeding the value of five pounds were exempted from contribution to the county cess. The general consequence was that the farmers' residences throughout the country were kept down to the level of mere cottages or inconvenient hovels, to avoid passing the line of contribution, and only passed it by indulgent or evasive valuations. But the supposed exemption, which no doubt was procured as a boon, was productive of further ill effects to the parties intended to be benefited. Being kept by the immediate expense and the fear of their share of the tax to thatched roofs, these thatched roofs afforded facilities to incendiarism, since any one might put a cinder in the thatch, and run away without detection; hence it placed the inmates so far under continued terror in disturbed times, that it would frequently have been worth the expense of putting on a slate roof as a measure of

preventive policy. The depression of the tenement always is practically a depression of the habits and condition of the inhabitants.

I may assume that it has been proved that the labouring classes do possess the means of purchasing the comforts of superior dwellings, and also that they are not benefited by exemptions from the immediate charges wherever requisite to defray the expense of superior comforts.

I shall now show how little it is in the power of these classes voluntarily to obtain these improvements, setting aside entirely the consideration of the obstacles arising from depraved habits already formed.

The workman's "location," as it is termed, is generally governed by his work, near which he must reside. The sort of house, and often the particular house, may be said to be, and usually is, a monopoly. On arriving at manhood in a crowded neighbourhood, if he wishes to have a house, he must avail himself of the first vacancy that presents itself; if there happen to be more houses vacant than one, the houses being usually of the same class, little range of choice is thereby presented to him. In particular neighbourhoods near Manchester and in other parts of the county of Lancaster, in some other manufacturing and in some rural districts, instances occur of the erection of improved ranges of larger and better-constructed houses for the labouring classes; and, making deduction for the occasional misuse of the increased space by subdividing them and overcrowding them with lodgers

the extent to which these improved tenements are sought, and the manner in which an improved rent is paid, afford gratifying evidence of an increasing disposition prevalent amongst artisans to avail themselves of such improvements. These opportunities, however, are comparatively few, and occur in districts where multitudes continue in the most depressed condition, apparently without any power of emerging from it.

The individual labourer has little or no power over the internal structure and economy of the dwelling which has fallen to his lot. If the water be not laid on in the other houses in the street, or if the house be unprovided with proper receptacles for refuse, it is not in the power of any individual workman who may perceive the advantages of such accommodations to procure them. He has as little control over the external economy of his residence as of the structure of the street before it, whether it shall be paved or unpaved, drained or undrained. It may be said that he might cleanse the street before his own door. By some local Acts the obligation to do so is imposed on the individual inhabitants. By those inhabitants who have servants this duty may be and is performed, but the labourer has no servant; all of his family who are capable of labour are out afield, or in the manufactory or the workshop, at daybreak, and return only at nightfall, and this regulation therefore is unavoidably neglected. Under the slavery of the existing habits of labourers, it is found that the faculty of perceiving the

advantage of a change is so obliterated as to render them incapable of using, or indifferent to the use of, the means of improvement which may happen to come within their reach. The sense of smell, for instance, which generally gives certain warning of the presence of malaria or gases noxious to the health, appears often to be obliterated in the labourer by his employment. He appears to be insensible to anything but changes of temperature, and there is scarcely any stench which is not endured to avoid slight cold.

It would have been matter of sincere congratulation to have met in the early days of sanitation with more extensive evidence of spontaneous improvement amongst the classes in receipt of high wages, but nearly all the beneficial changes found in progress throughout the country were changes that had arisen from the efforts of persons of the superior class. Inquiries were made for plans of improved tenements, but none were found which could be presented as improvements originating with the class intended to be accommodated. In the rural districts, the worst of the new cottages were those erected on the borders of commons by the labourers themselves. In the manufacturing districts, the tenements erected by building clubs and by speculating builders of the class of workmen were frequently the subject of complaint, as being the least substantial and the most destitute of proper accommodation. The only conspicuous instances of improved residences of the labouring classes found in rural districts were those which had been erected by opulent

and benevolent landlords, and in the manufacturing districts those erected by wealthy manufacturers for the accommodation of their own workpeople.

Preparatory to the exposition of the means of protection of the public health provided by the existing law, and of the modifications that appear to be requisite for the attainment of the object in question, I would submit for consideration practical examples of its partial attainment by means of improved dwellings, combined with examples of other improvements effected in the moral condition of the labouring classes by the judicious exercise of the influence possessed by their superiors in condition.

Throughout the country examples are found of a desire, on the part of persons of the higher class, to improve the condition of the poorer classes by the erection of dwellings of a superior order for their accommodation. These, however, are generally at a cost beyond any return to be expected, in the present state of the habits of the people, in the shape of rent, or any return in money for an outlay on an ordinary investment of capital. But the instances about to be noticed, though generally originating in benevolence, and without the expectation of a return, do, in the results, prove that in money and money's worth, the erection of good tenements affords the inducement of a fair remuneration to the employers of labour to provide improved accommodation for their own labourers.

Wherever it has been brought under observation,

the connection of the labourer's residence with his employment as part of the farm, or of the estate, or of the manufactory on which he is employed, and as part of the inducement to service, appears to be mutually advantageous to the employer and the employed.

The first advantages are to the person employed.

He everywhere finds (in contradiction to statements frequently made in popular declamations) that the labourer gains by his connection with large capital: in the instances presented in the course of this inquiry, of residences held from the employer, we find that the labourer gains by the expenditure for the external appearance of that which is known to be part of the property,—an expenditure that is generally accompanied by corresponding internal comforts; he gains by all the surrounding advantages of good roads and drainage, and by more sustained and powerful care to maintain them; he gains by the closer proximity to his work attendant on such an arrangement, and he thus avoids all the attacks of disease occasioned by exposure to wet and cold, and the additional fatigue in traversing long distances to and from his home in the damp of early morning or of nightfall. The exposure to weather, after leaving the place of work, is one prolific cause of disease, especially to the young. When the home is near to the place of work, the labourer is enabled to take his dinner with his family instead of at the beershop.

The wife and family generally gain, by proximity to

the employer or the employer's family, in motives to neatness and cleanliness by their being known and being under observation. As a general rule, the whole economy of the cottages in byelanes and out-of-the-way places appears to be below those exposed to observation. In connection with property or large capital, the labourer gains in the stability of employment and the regularity of income incidental to operations on a large scale; there is a mutual benefit also in the wages for service being given in the shape of buildings or permanent and assured comforts, that is in what would be the best application of wages, rather than wholly in money wages. In the manufacturing districts there is a mutual and large gain by the diminution of the labour of the collection of rents, the avoidance of the risk of non-payment, and also in the power of control for the prevention of disturbances and the removal of tenants of bad character and conduct.

Surprise is frequently expressed at the enormous rents, ranging up to and beyond twenty per cent. on outlay, exacted by the building speculators in the towns. But when the experience of these descriptions of tenements is examined, it is found that the labour of collecting the rents and the labour of protecting the property itself against waste from unprincipled tenants is such as to prove that accommodation given to the disorderly and vicious is scarcely remunerative at any price. The tenants are loosely attached, large numbers migratory, and partly from the nature of their work,

and having little or no goods and furniture, they have no obstacles to removal; they frequently, before absconding, commit every description of waste; they often burn shelves and cupboard doors, and the house door itself, and all timber that can be got at for the purpose. An objection frequently made against laying on the water in houses inhabited by a population addicted to drinking is, that they would sell the receptacles, and destroy the pipe, and let the water run to waste, for the sake of the lead. The expense and delay of legal remedies preclude redress for such injuries.

In some of the worst neighbourhoods of Manchester, the whole population of a street have risen to resist the service of legal process by the civil officers. In the course of the constabulary inquiry I was informed by the superintendent of the old police of that town, that one of the most dangerous services for a small force was attending to enforce ejectments. This they had often to do cutlass in hand, and were frequently driven off by showers of bricks from the mobs. The collection of the rents weekly in such neighbourhoods is always a disagreeable service, requiring high payment. This, and the frequent running away of the tenant, and the waste, greatly reduce the apparently enormous rent obtainable from this poorer class of tenants. For all these vices, risks, and defaults of others, the frugal and well-conducted workman, who has no choice of habitation, is compelled to pay in the shape of an increased rent; he is most largely taxed in the

increased rent, necessary as an insurance for the risks and losses occasioned by the defective state of legal remedies.

All these risks the employer is enabled to diminish or avoid by selecting his own tenants, and he has the best means of doing so ; by reservations of rent on the payment of wages, he saves the labour and risks of collection ; nor will the vicious workman so readily commit waste in the house belonging to his employer as in one belonging to a poorer and unconnected owner. The employer has, moreover, the most direct interest in the health and strength of his workpeople.

It is not supposed that these are arrangements which can be universal, or readily made the subject of legislation. At the commencement of some manufactures, the additional outlay may not be practicable. But those manufacturers have generally had the greatest success where good accommodation for the workpeople was comprehended in the first arrangements. When, however, a manufactory has been once established and brought into systematic operation, when the first uncertainties have been overcome, and the employer has time to look about him, there appears to be no position from which so extensive and certain a beneficial influence may be exercised as that of the capitalist who stands in the double relation of landlord and employer. He will find, that whilst an unhealthy and vicious population is an expensive as well as a dangerous one, all improvements in the condition of the population have their compensation.

PART II.

HEALTH IN THE SCHOOL.


(EDUCATIONAL HEALTH.)

PART II.

HEALTH IN THE SCHOOL.

CHAPTER I.

HALF-TIME IN EDUCATION FOR HEALTH AND LEARNING.

HE *Half-Time System* in school life includes a division of labour for the scholar, in which it is arranged that a limited time shall be devoted to book learning, a limited time to physical work, and a limited time, when that can be effected, to games or other exercises which afford pleasure to the mind.

The mode in which this reform originated is as follows:—

In 1833 I was appointed one of a Central Commission to examine into the condition of the labour of children and of young persons employed in factories. The commissioners found generally that the children were worked during the same stages as adults,—eleven, twelve, or more hours daily; and they condemned this practice as being economically as wasteful as would be, on a farm, the working of young colts

to the same extent as adult horses ; they pronounced that six hours of daily labour was as long as could be allowed for young children without permanent bodily injury, and that manufacturers continuing to enforce work during those long hours must do so with double sets of children, six hours each set. The ordinary condition of long-time labour in factories had practically excluded the children from the benefits of education ; so that a population had been growing up, deteriorated morally as well as physically by excess of labour. Physically the effects of excessive hours of labour were aggravated by the bad sanitary conditions of ill-ventilated and ill-drained workshops, and ill-drained and ill-ventilated dwellings ; while the economical results, waste of working force, were such as would be the case if the farmer, to obtain one working horse, had to raise two colts, or as if the adult working horse, when raised, lasted only two-thirds of the productive time that would be obtained under better sanitary conditions.

It fell to my part to work out a bill providing for the organisation of executive machinery for the application of the principles which were adopted by the Commission, and the provision which I proposed for the protection of the working population against exclusion from education was, that it should be a condition of the employment of children by the manufacturer, that every child so employed should produce a certificate from a competent teacher in a fitting school, certifying that the child had been

under instruction three hours every working day during the week preceding. Three hours a day was half the time then generally occupied in the working schools. Hence the name half-school timers.

My colleagues of the Commission agreed in declaring, upon adequate medical testimony, that even ten hours' daily continuous labour for little children, as implied in a ten hours' bill, was too long, and proposed, as a compromise, a limitation to eight. But being individually charged by the Government with the preparation of the bill, I inserted provisions for a limitation of children's labour to six hours, and it was really a six hours' bill which was carried through the House of Commons, together with the condition of employment that every child employed should be three hours a day under a competent school teacher, with a rating clause for providing sufficient schools and school teachers where none were found to exist.

The three hours or half-school time provision was intended not solely as a security for education, which my own educational information enabled me to say was as much time as could be occupied profitably with any subject-matters of instruction with very young children, but as a primary security against over-work. I reasoned that if the presence of children in school for three hours were secured, their absence for that time from the workshop prevented and cut off that amount of time from any adult stage of work to which they would otherwise be subjected. The three

hours' compulsory attendance at school, even where the teaching was inferior or nominal, soon proved successful as a preventive of bodily overwork. The effect was, as medical officers attested, a better growth, and also a better quality of labour during the reduced hours—as employers admitted. The securities for the competency of the school teaching, and the rating clauses, having been thrown out of the House of Lords, the education was often extensively nominal, illusory, and often fraudulent. But where, by voluntary exertions, the half school-time teaching was provided of a proper quality, as by intelligent manufacturers, such as the Messrs. Walker of Bradford, Mr. Ackroyd, the Messrs. Ashworth of Bolton, Mr. Bazley of Manchester, the Messrs. Chadwick of Rochdale, the Messrs. Birley of Manchester; or where there were schools under trained masters to whom the “half-timers” were sent, as at Oldham, Rochdale, Manchester, and elsewhere; or where, as in the Poor Law district schools, the half-time system was carried out,—there was testimony, from experienced school teachers, of practical results which affected the whole of the prevalent practice of infantile and juvenile training and education.

The experience of the short school-time district industrial schools was soon demonstrative of a general conclusion that by the administrative division of educational labour the elements of popular education, reading well, with some skill in parsing, writing a fair hand, spelling well, arithmetic up to decimal fractions, the

naval and military drill, and vocal music, might be taught well together, with the elements of religious instruction, in about one-half the time before commonly occupied in teaching indifferently the three elementary branches, as they are considered, of a popular education.

It was found that, beginning with the infant school, these courses of mental and bodily accomplishments might generally be completed soon after the tenth year; whereas, under the previous practice, school-attendance was required until the thirteenth year for the communication of an inferior amount of book instruction alone. The practicability of the reduction by one-half of the ordinary period of teaching was established by the evidence of the most successful school teachers.

The gain in time, from six or five to three hours daily school-attendance, and from six to three years,—half the term commonly occupied,—was not the sole nor the most important gain achieved in the large, separate schools by the division of educational labour, and the application of the half-time principle. A boy who acquired the same amount of knowledge in one-half the time of another boy, obtained a proportionately superior habit of mental activity. This was soon the experience stated, in good half-time school districts, by employers of labour, who ceased to employ “long-timers” where they could get the “short-timers;” and this quality of superior mental alertness, combined with the bodily aptitudes created by previous drill, gave the comparatively stunted pauper boys of the towns

the preference over the strong robust lads from the coast.

The division of educational labour by trained teachers in the district schools and in the larger public schools, founded on the same principles, surpassed, as might be expected, all small schools in which the common elementary instruction for the middle class prevailed, and, indeed, the instruction in the older schools for higher classes also.

Next to the gain in time by the division of educational labour, in the system exemplified in the district school, was the gain in pecuniary economy.

By means of a staff of qualified permanent paid officers and a division of labour, with gradations of administrative superintendence in each Poor Law Union, there was effected an average yearly economy of upwards of two millions; and if the principles which were laid down had been adopted by Parliament, with some additional outlay for qualified paid service, the economy might have been carried to between three and four millions per annum upon the previous expenditure of the unpaid overseer, or the single paid officer—the assistant overseer. Thus it was proved, in the instance of the district schools, that by means of an educational division of labour on the administrative principle suggested by a staff of school teachers, comprising, in the best instances, the services of a principal with those of a chaplain, a head master at about £200 per annum, first and second assistant masters, and a staff of pupil teachers, drill masters, and drawing

masters, an economy of fully one-half was effected against the single master—even though he were a trained master—teaching on a small scale. The expense of the educational power of the trained staff was, on the average in the district schools, £1 per head per annum.

Applying the same lessons to industries, it is just to observe that the industrial advance of the country now depends mainly on machinery, and its invention depends on increased intelligence; and the industrial course is to put more and more of machinery, more and more of capital, under single hands, requiring more and more of intelligence and mental effort, which cannot be attained without workmen of increased intelligence, and this cannot be attained without higher wages. At present in Lancashire, the highest wages are given for the attainment of the lowest cost of production anywhere. But the attention required to attain these conditions cannot be sustained for long hours, and a reduction of the working hours is progressive now in some manufactures down to eight hours a day.

CHAPTER II.

THE POWER TO LEARN WITH HEALTH OF BODY.

THE business of education requires for its successful prosecution scientific observation, and the study of the subject to be operated upon—the human mind. Even to empirical observation it should have suggested itself that the mind has conditions of growth which are required to be carefully noted, to adapt the amount of instruction intended to be given to the power of receiving it. It is a psychological law that the capacity of attention grows with the body, and that at all stages of bodily growth the capacity is increased by the skilful teacher's cultivation. Very young children can only receive lessons of one or two minutes' length. With increasing growth and cultivation, their capacity of attention is increased to five minutes; then to ten, and at from five to seven years of age, to fifteen minutes. With growth and cultivation, by the tenth year a bright voluntary attention may be got to a lesson of twenty minutes; at about twelve years of age to twenty-five minutes; and from thence to fifteen years of age, about half an hour: that is to say, of lessons requiring mental effort, as arithmetic, not carried beyond the point at which the

mind is fatigued, with the average of children and with good teaching. By very skilful teachers and with very interesting lessons, the attention may be sustained for longer periods; but it is declared by skilled observers that prolonged attention beyond average limits is generally at the expense of succeeding lessons.

The preponderant testimony which has been received in the course of some inquiries into educational subjects, is that with children of about the average age of ten, or eleven, or a little more, the capacity of bright voluntary attention, which is the only profitable attention, is exhausted by four varied lessons in subjects and exercises requiring mental effort of half an hour each in the forenoon, even with intervals of relief. After the mid-day meal the capacity of voluntary attention is generally reduced by one-half, and not more than two half-hour lessons requiring mental effort can be given with profit.

The capacity of attention is found to be greater in cold weather than in hot, in winter than in summer.

I collect that the good ventilation, lighting, and warming of a schoolroom will augment the capacity of attention of the pupils by at least one-fifth, as compared with that of the children taught in school-rooms of the common construction.

I also collect, that the capacity of attention varies with bodily strength and weakness. It is reported to me that school-boys, of nearly the same ages and conditions, of the same schoolrooms, and under the same tuition, being weighed, and divided into two

classes, the light and the heavy, the attainments, as denoted by the number of marks obtained, were found to be the greatest with the heaviest, that is to say, those of the greatest health and bodily strength.

These were chiefly town-born children, of common habits. The robust children of rural districts, of less cultivated habits of attention, are found to be slower in receiving ideas; but with cultivation they are brought up to equal capacities of attention, and to greater retentiveness of the matter taught, than the common classes of town-born children.

There are differences in the capacities of attention in different races, or in the habits of attention created previously to the school-period by parents of different races. The teacher of a large school in Lancashire, who had acted as a school-teacher in the southern counties, rated the capacity of attention of the native Lancashire children as five to four, as compared with those in Norfolk. In other instances the differences were wider.

Experienced teachers have testified to me that they can and do exhaust the capacity of attention, to lessons requiring mental effort, of the great average of children attending the primary schools in England, in less than three hours of daily book instruction, namely, two hours in the morning, and one hour after the mid-day meal.

Infants are kept in school, and the teacher is occupied in amusing and instructing them, for five or six hours, but the duration of mental effort in the

aggregate bears only a short proportion to the whole time during which they are kept together. So in schools for children of more advanced ages. Even the smaller amount of mental effort in infant schools is extremely subject to dangerous excess. I am assured by a teacher in the first infant school established in Scotland, that he did not know a pre-eminently sharp child who had in after life been mentally distinguished.

In common schools, on the small scale, the children will frequently be not more than one-half the time under actual tuition; and in schools deemed good, often one-third of their time is wasted in changes of lessons, writing, and operations which do not exercise, but rather repair the receptive faculty.

It may be stated generally that the psychological limits of the capacity of attention and of profitable mental labour is about one-half the common school-time of children, and that beyond that limit instruction is profitless.

This I establish in this way. Under the Factories Act, whilst much of the instruction is of an inferior character and effect, from the frustration of the provisions of the original bill, there are now numerous voluntary schools in which the instruction is efficient. The limit of the time of instruction required by the statute in these half-time schools for factory children is three hours of daily school teaching, the common average being six in summer and five in winter. There are also pauper district industrial schools, where the

same hours, three daily, or eighteen in the week, or the half-time instruction, are prescribed; which regulation is, in some instances, carried out on alternate days of school teaching and on alternate days of industrial occupation. Throughout the country there are now mixed schools, where the girls are employed a part of the day in needlework, and part of the day in book instruction.

The testimony of school inspectors and of school teachers alike indicates that the girls fully equal in book attainments the boys who are occupied during the whole day in book instruction. The preponderant testimony is that in the same schools, where the half-time factory pupils are instructed with the full-time day scholars, the book attainments of the half-time scholars are fully equal to those of the full-time scholars, *i.e.*, the three hours' are as productive as the six hours' mental labour daily. The like results are obtained in the district pauper schools. In one large establishment, containing about six hundred children, half girls and half boys, the means of industrial occupation were gained for the girls before any were obtained for the boys. The girls were, therefore, put upon half-time tuition, that is to say, their time of book instruction was reduced from thirty-six hours to eighteen hours per week, given on the three alternate days of their industrial occupation, the boys remaining at full school-time of thirty-six hours per week—the teaching being the same, on the same system and by the same teachers, with the

same school attendance in weeks and years, in both cases.

On the periodical examination of this school, surprise was expressed by the inspectors at finding how much more alert, mentally, the girls were than the boys, and how much advanced in book attainments. Subsequently industrial occupation was found for the boys, when their time of book instruction was reduced from thirty-six hours a week to eighteen; and after a while the boys were proved upon examination to have obtained their previous relative position, which was in advance of the girls. The chief circumstances effecting this result, as respects the boys, were the introduction of active bodily exercises, the naval and the military drill, and the reduction of the duration of the school teaching to within what appear to me to be the psychological limits of the capacity of voluntary attention.

When book instruction is given under circumstances combining bodily with mental exercises, not only are the book attainments of the half-time scholars proved to be more than equal to those of the full-time scholars, but their aptitudes for applying them are superior, and they are preferred by employers for their superior alertness and efficiency.

In the common course of book instruction, and in the average of small but well managed long-time schools, children, after leaving an infant school, are occupied on the average six years in learning to read and write and spell fairly, and in acquiring proficiency

in arithmetic up to decimal fractions. In the larger half-time schools, with a subdivision of educational labour, the same elementary branches of instruction are taught better in three years, and at about half the annual expense for superior educational power.

The general results stated, have been collected from the experience during a period of from twelve to fifteen years of schools, comprising altogether between ten and twelve thousand pupils. From such experience it appears that the general average school time is in excess full double of the *psychological* limits of the capacities of the average of children for lessons requiring mental effort.

I have not hitherto been enabled to carry my inquiries to any sufficient extent for a statement of particular results to the schools for children or youth of the higher ages, but I believe it will be found that the school and collegiate requirements are everywhere more or less in excess of psychological limits. I gather that the average study, in continuous mental labour, of successful prizemen at the universities, is from five hours and a half to little more than six hours of close mental study or exertion from day to day. An able Oxford examiner informs me, that if he ever hears that some one is coming up for examination who has been reading twelve or thirteen hours a day, he is accustomed to exclaim, "That man will be plucked!" and during his experience of thirteen years as an examiner at Oxford, he has never known an instance to the contrary. In

respect to the mental labour of adults, it is observed by Sir Benjamin Brodie in his "Psychological Inquiries":—"A man in a profession may be engaged in professional matters for twelve or thirteen hours daily, and suffer no very great inconvenience beyond that which may be traced to bodily fatigue. The greater part of what he has to do (at least it is so after a certain amount of experience) is nearly the same as that which he has done many times before, and becomes almost matter of course. He uses not only his previous knowledge of facts, or his simple experience, but his previous thoughts, and the conclusions at which he had arrived formerly; and it is only at intervals that he is called upon to make any considerable mental exertion. But at every step in the composition of his philosophical works Lord Bacon had to think, and no one can be engaged in that which requires a sustained effort of thought for more than a very limited portion of the twenty-four hours.

But great things are accomplished more frequently by moderate efforts persevered in with intervals of relaxation during a very long period. I have been informed that Cuvier was usually engaged for seven hours daily in his scientific researches; but these were not of a nature to require continuous thought. Sir Walter Scott, if my recollection be accurate, describes himself as having devoted about six hours daily to literary composition, and his mind was then in a state to enjoy some lighter pursuit afterwards.

After his misfortunes, however, he allowed himself no relaxation, and there can be little doubt that this over-exertion contributed as much as the moral suffering which he endured to the production of the disease of the brain, which ultimately caused his death. Sir David Wilkie found that he was exhausted, if employed in his peculiar line of art for more than four or five hours daily; and it is probable that it was to relieve himself from the effects of too great labour that he turned to the easier occupation of portrait-painting. In fact, even among the higher grades of mind there are but a few that are capable of sustained thought, repeated day after day, for a much longer period than this."

Sir Benjamin Brodie once stated to me that he subsequently ascertained that in the above passage he had rather exceeded the limits of the mental labour of Sir Walter Scott, who, in a conversation on the topic, in the presence of Sir Charles Lyell and Mr. Lockhart, had declared that he worked for three hours with pleasure, but that beyond about four hours he worked with pain. Sir Benjamin stated to me that he was of opinion "that for young children three or four hours' occupation in school must be even more than sufficient, and that they would be found in the end to have made greater progress, if their exertions were thus limited, than if they were continued for a longer period.

In large public establishments in which I have had an executive direction, I have not found it


practicable to sustain, on the average, for longer than six hours per diem, from day to day, continuous and steady mental labour on the part of adults.

I find ground for the belief that as more and more of mental effort and skill is required in the exercise of the manual arts, the hours of work must be more and more reduced for the attainment of the best economical results without waste of the bodily power.

I am further of opinion that the defect of the Anglo-Saxon population especially is rudeness of manner. Experiences show that that rudeness is removable in the infantile stages by school training under ladies, and that it is altogether an economy to employ ladies at advanced salaries as teachers until the scholars reach, at least, to the age of puberty.

CHAPTER III.

THE POWER TO LEARN WITH HEALTH OF MIND.

HE limits to mental labour are governed by the powers of the body to learn, which in the case of young children are first indicated by bodily pain, experienced during continued sedentary constraint, from suppressed muscular activity, or from muscular irritability. As respects children, the case is put in the following letter which I wrote to Professor Owen, and in his answer :—

“DEAR OWEN,—Permit me to submit to you for your consideration and for my instruction, some questions on topics of observation made from time to time officially on the common practice of popular education, and whether, in the duration of sedentary attention which its theory requires, it is not at variance with elementary principles of physiology ?

“First, let me observe upon the very young of our species, their mobility at the periods of growth, particularly in infancy,—their constant changes of bodily position, when free to change,—their incessant desire for muscular exertion,—their changes, short at first, longer as growth advances,—these changes being

excited by quickly varying objects of mental attention, and forming incessantly varying alternations of exertion and repose, with manifestations of pleasure when allowed free scope for them, of pain when long restrained. Now to what physiological conditions do these alternations of exertion and repose subserve?

“When obstructed and subjected to constraints for long periods, and when pain and mental irritation and resistance are excited amongst *classes*, are not the pain and resistance to be taken as a remonstrance of nature against a violation of its laws?

“The theory of the common practice of school instruction is of five and as much as six hours’ quietude, and for intervals of three hours each, perfect muscular inactivity and stillness of very young and growing children from seven to ten years old, and during this constrained muscular inactivity, continuous mental attention and labour.

“To ensure these conditions of continued bodily inactivity and prolonged mental labour, the common office of the schoolmaster is everywhere a war for the repression of resistances and incipient rebellions. But are not these resistances excited by nature herself? Are not desk cutting, whittling with knives, mischief, conditions of irritability, manifestations of excessive constraints against physiology? If the conditions of muscular inactivity were completely enforced, what does physiology tell us may be expected from these restraints? I might ask you, indeed, whether much of the insanitary conditions of our juvenile and very

young populations are not consequences following from them?

“First, there is the proverbial pale-facedness of the young scholar, and the lower bodily condition of those who are subject to the confinement of schools, even of the best construction and ventilation, than of those who are free from confinement and at large, at liberty to follow natural instincts.

“When the weakly fail in health in a marked degree under the restraints of the school, the remedy is restoration to natural freedom, which commonly leads to improved health. I cannot but attribute to the lowering of the system and bodily debility produced by this excessive school restraint (even where there is good ventilation), and the consequent exposure to epidemic conditions and other passing causes of disease, a large share of our juvenile mortality, especially between seven and ten years of age, when the opportunities of retrieving the effects of the school constraints by athletic exercises are less than at later periods.

“But the constraints of a school are accomplished most fully in girls’ schools, more especially in boarding schools, where the sedentary application of young children is extended to eight hours daily, and diseases are attendant upon them, which I cannot help ascribing largely to violations of the laws of physiology. In Manchester, with the increase of prosperity, an increased proportion of females have been sent to boarding schools and high class schools with long hours; and

I am assured by Mr. Roberton, who is especially conversant with the diseases of females, that the proportion of the mothers of the middle class who cannot suckle their own children is increasing. He has shown me statistically that, with all the care bestowed upon females who have been so highly educated, the failures and deaths in child-birth are full sevenfold greater than amongst females of a lower condition in life, who have had less school restraint and sedentary application, and more freedom and muscular development in childhood. Cases of spinal distortion, nervous disorder, nervous mania, and hysteria, prevail peculiarly amongst the middle and higher class of females, whose education has been of prolonged sedentary occupation, even under the best sanitary conditions in other respects. As applied to them, it is a proverbial observation that 'ailing mothers make moaning children.' A lady who was eminent as a boarding school teacher, but who has retired from business, has observed painful evidence of the injury done by the prolonged hours of sedentary application which custom and the demands of parents require, and she confirms the experience of the best half-time schools, that better instruction might be given in shorter hours. I have received a body of evidence from able teachers, that they can and do exhaust the capacity of attention to book instruction in half the time for which sustained attention to such instruction and bodily inactivity is demanded by custom.

"But what I seek is the sanction of your opinion as to

whether, if the laws of physiology be duly consulted for providing a sound body for a sound mind, other treatment is needed than that which prevails in schools, of requiring five or six hours of sedentary occupation for children in the infantile stage, and seven or eight for those in the juvenile stage? I appeal to you more particularly from the fact, that in lectures and papers the teaching of physiology is insisted upon as an additional element of popular education, and an additional demand of time in those schools, the whole condition and theory and attempted practice of which, though not yet so recognised generally by professors of the science, appears to me to be a large violation of it, and an offence against infantile nature.

“Yours ever,

“E. CHADWICK.”

“MY DEAR CHADWICK,—I have perused and carefully considered every point in the inquiry which you have addressed to me, and I concur completely with your belief in the agreement with nature of the changes you recommend in the distribution and change of the periods devoted to school restraint and studies, and to bodily exercise and relaxation.

“All the nutritive functions and actions of growth proceed more vigorously and rapidly in childhood and youth than in mature life,—not merely as regards the solids and ordinary fluids, but also in the production of those imponderable and interchangeable forces which have sometimes been personified as ‘nervous

fluid,' 'muscular force,' etc. Using the latter term to exemplify my meaning, the excess of nervous force is in the child most naturally and healthily reduced by its conversion into muscular force; and at very short intervals, during the active or waking period of life, the child instinctively uses its muscles, and relieves the brain and nerves of their accumulated force, which passes, by the intermediate contraction of the muscular fibre, into ordinary force or motion, exemplified by the child's own movements, and by those of some object or other which has attracted its attention.

"The tissues of the growing organs, brain, muscles, etc., are, at this period of life, too soft to bear a long continuance of their proper actions; their fibres have not attained their mature tone and firmness; this is more especially the case with the brain fibre. The direct action of the brain, as in the mental application to learning, soon tires; if it be too long continued, the tissues are unhealthily affected; the due progress of growth, which should have resulted in a fibre fit for good and continuous labour at maturity, is interfered with; the child, as an intellectual instrument, is to that extent spoiled by an error in the process by which that instrument was sought to be improved.

"The same effect on the muscular system is exemplified in the racers that are now trained to run, at $2\frac{1}{2}$ or 3 years old, for the grand prizes at Doncaster or Epsom. The winner of the 'Derby' never becomes an 'Eclipse' or 'Flying Childers,' because the

muscular system has been overwrought two or three years before it could have arrived at its full development, which development is stopped by the premature over-exertion.

“If the brain be not stimulated to work, but is allowed to rest; and if, at the same time, the muscles be forbidden to act, there then arises, if this restraint be too prolonged, an overcharged state of the nervous system. It is such a state as we see exemplified in the caged quadruped of active habits, when it seeks to relieve it by converting the nervous into the muscular force to the extent permitted by its prison, either executing a succession of bounds against the prison bars, like the agile leopard, or stalking, like the lion, sullenly to and fro.

“If the active child be too long prevented from gratifying the instinctive impulse to put in motion its limbs or body, the nervous system becomes overcharged, and the relief may at last be got by violent emotions or acts, called ‘passion’ or ‘naughtiness,’ ending in a fit of crying and flood of tears.

“But all these impediments to a healthy development of the nervous system might be obviated by regulations, based on the system which you rightly advocate, providing for more frequent alternations of labour and rest, of study and play, of mental exertion and muscular exercise; in other words, by briefer and more frequent periods allotted to those phases of educational procedure, and modified to suit two or three divisions of the scholars, according to age.

“The powers and workings of the human frame concerned in the complex acts and influences, which you have asked me to explain physiologically, are amongst the most recondite and difficult in our science. You will, therefore, comprehend and excuse my shortcomings in trying to fulfil your wish. But, on the main point, I have no doubt that your aim is in close accordance with the nature of the delicate and, for good or evil, easily impressible organisation of the child.

“Believe me, ever truly yours,

“RICHARD OWEN.”

It is difficult to separate distinctly the evils arising from the excess of simple bodily inactivity, from the results of the common insanitary conditions of schools—bad ventilation, bad lighting, bad warming, and overcrowding. These, however, are attended by epidemic and eruptive diseases, which ravage the infantile community. Simple constraint appears to be attended by enervation and obstructed functions, and thence maladies of another class. The preventive of these is the occupation of children, with means of physical training, with systematized gymnastics, including swimming, and the naval and military drill. Where there have been good approximations to the proper physiological as well as the psychological conditions, as in the half-time industrial district schools, epidemic diseases have been banished, and the rate of mortality reduced to one-third of that

which prevails amongst the general community in England and Wales alone, where upwards of a quarter of a million of children are annually swept away by preventable disease, which enervates those who survive. Four labourers, who have had the advantage of this improved physical and mental training, are proved to be as efficient as five or more of those who have not. I am prepared to show that by administrative improvements in the application of the principles in question, double the population may be physically and mentally trained well, at the expense of educating the existing numbers ill.

CHAPTER IV.

FAILURES IN EDUCATION NATIONAL AND GENERAL.*



ONE cause of the little progress made in elementary education is that information relating to it has generally been confined to the cloister, a very moat bounded by the four walls of the schoolroom. The children are seen to depart from the school, and there is very little outlook as to what becomes of them afterwards, or what has been the result of the educational work performed. I have myself derived great advantage from inquiries as to the outcome, as to the difference in results, between educated and uneducated force in the army and the navy,—where the results on masses are best seen,—in the manufactory and in the workshops, and in the fields of agriculture. On the whole, the results are favourable; education as it commonly exists, under the continuance of the present system, is worth having where none better can be got. But the

* This essay is condensed from a little work published in 1881, and entitled briefly "National Education," being a *résumé* of collections of evidence, prepared for the Educational Section of the Social Science Association at Edinburgh. Much of it was translated into French and submitted as a paper at the International Congress at Brussels.

long-time teaching has large physical drawbacks. The first evil is a reduction of aptitude for physical labour and steady industry.

FIRST LIVE, THEN LEARN.

We must keep in view, as a cardinal maxim, as the first objective point in all popular elementary education, the *Primo vivere, deinde philosophari*. Long desk-work makes labour painful to the pupils at the outset. It is said, in manufactories, that their backs are stiff, and that they cannot bend to work. It certainly tends with us to overcharge the labour market for sedentary service at the expense of agricultural service. It is now a subject of wide complaint in our rural districts, that the eyes of children taken into schools, under the new compulsory law, are seriously injured. We see such a result elsewhere in the large proportion of the soldiers who are spectaclled in some of the more educated States on the Continent. Then as respects females, we find that curvatures of the spine are seriously frequent in long-time schools where physical exercises are deficient. Certainly the common schools are the centres of children's epidemics, as sanitary science would expect from the massing of dirty-skinned and dirty-clothed children together for a long time in ill-ventilated rooms. This particular evil the half-school-time principle reduces decidedly and immediately by much more than one-half.

With us, and in France and Belgium, there are

complaints of the increasing scarcity of competent agricultural labour, and of the tendency which the population shows to seek the more sedentary or more interesting society of the towns. This evil agriculturists are beginning to trace to the defective character of their education, which fails to interest them in rural life and rural occupations. This great and growing evil I have long perceived, and have endeavoured to point out the remedy in the application of the half-time principle, which would give part of the day to the school, and part of the day to the field, while that part spent in the field, under special teaching, would awaken more interest in the practice of the specially applied science needed there. We have complete proof of the power of creating special technical interests in the new half-time training schools for the army and the navy. The pupils there are free to enter civil life; both at the military schools and the naval schools the great majority volunteer in the direction of their special training, and the commandants are glad to have them. It has been proved, in respect to the navy, where many of them become warrant officers (or *sous-officers*), that if the children had not been orphans the expense of their training would still be remunerative as against the untrained or ill-trained hands, the sons of fishermen, to be found in the seaports.

An American naval officer, Mr. Faulkner Chadwick, was deputed by his Government to examine the

different naval schools in Europe, and he pronounced our naval half-time school at Greenwich to be superior, as a model, to any he had examined on the Continent. It is superior as tested by the outcome. On such experiences, and some direct agricultural experience, I could confidently undertake that the grievances of which the agriculturalists' party complain, of the want of interest in their service created by the common education, admit of a complete remedy by the competent application of the half-time principle.

MORAL FAILURES FROM THE LONG-TIME SYSTEM.

A darker feature is yet to be noticed in the present long-time system in England and elsewhere, in the extent of the moral failures that are overlooked by confining the view to the scholastic results and four walls of the school, and disregarding the real object of attention,—the outcome. The criminal classes with us, of whom there are about a hundred thousand at large, sustain a population of some twenty thousand always in our prisons. In our small army there are some twenty thousand courts-martial yearly, and a number equal to a fourth of the British force at Waterloo has passed through the prisons annually. I specify these failures in the army the more particularly, because the outcome of the army half-time schools demonstrates, that by a general application of the principles there in operation, no such extent of failures as those displayed in the outcome of the common elementary schools could take place. Two-thirds

certainly of our soldiers have partaken of an education not materially inferior to the long-time education, of the extension of which under a compulsory system our education ministers are boasting.

The education of some of the prisoners is set down as superior. In the criminal returns of the metropolis there are more than a thousand clerks, forty-two lawyers, besides a considerable number of other persons who have necessarily received a middle-class education. The Governor of one of the prisons told me that the greatest rascal he had in custody could write out our Lord's Prayer in seven languages. My functions have been those of a civil administrator, having to deal with the civil officers of the different religious denominations impartially; and it is just to state, as respects some of the religious denominations, that the effectiveness of their teaching is marked by the extreme rarity of the appearance of any of their flocks amongst the criminal classes. It is equally due to the chief half-time schools to state that the appearance of their pupils is not less rare.

On an inquiry as to the outcome of some middle-class educational institutions, it was shown, that the failures of their pupils from misconduct, disqualifying them from suitable service, average 20 per cent., whilst the like failures of the pupils of low parentage, in good half-time schools, does not average more than 2 or 3 per cent. The average had formerly been as high as 60 per cent. among pupils taken from the same classes. The like failures of long-time

school systems are denoted by later observations of the outcome in America and on the Continent. By some political writers the elementary school system of America was held forth for imitation; but its outcome is now regarded as fraught with great failures. "What a terrible satire upon our boasted school system is denoted by the word 'educated,'" says the *Philadelphia Times*. "Nine-tenths of the young criminals sent to the penitentiaries have enjoyed school advantages, but three-fourths of them have never learnt to do an honest stroke of work. Our children have their poor little brains crammed full of all kinds of impossible knowledge of names and dates, and numbers and unintelligible rules, until there is no room left to hold any of the simple truths of honour and duty and morality which former generations deemed more important than all the learning of the books."

Professor Dr. Robert T. Dabney, Principal of the Hampden Sidney Seminary, U.S., observes: "That where the State school system," *i.e.*, the elementary school system, "is in its infancy, as is evinced by the sparseness and poverty of the endowments, the greater penitentiaries and almshouses are few and small; but when the observer begins to admire the magnificent endowments and palatial buildings of the public schools, he is also struck with the number and vastness of the prisons. The two kinds of structures go together." In France it is now found that the largest contingent to the delinquent population of the

prisons is the outcome of the State schools for orphans and foundlings.

DISPOSAL OF JUVENILE DELINQUENTS.

Public attention has recently been strongly directed to the question as to the disposal of juvenile delinquents; and upon it I asked the manager of one of the district half-time institutions whether he had had cases to treat of the description of one kind of habitual criminality brought prominently before the public? He stated that he had, and that in a few months a large alteration in their character had been effected by the physical and industrial training on the half-time principle. If, say, a hundred cases of that character were committed to his charge, what proportion, I asked, could he undertake to send to the good? He answered confidently that, with fair support, he would undertake to send full 90 per cent. of them to the good; a large reverse of the proportion that prison discipline returns to the bad! The manager of longer experience in a larger institution in the metropolis would undertake to send 95 per cent. to the good.

The distinct formative effects of physical and mental training, in the efficient half-time training schools and institutions, and the reversal by them of the ordinary outcomes from the common long-time schools, especially in the eradication of incipient criminal habits, are owing to differences of conditions which it is important to note.

In the long-time schools during the time the boy is

kept there waiting under restraint his mind is absent from lessons, which are commonly so uninteresting as to be repugnant to his voluntary attention; his thoughts are away on cricket, or some sort of pleasurable play, and he generally only returns upon call to the lesson as a task to be got rid of. Under the restraint of separate confinement in a prison, the mind of the young criminal cannot, as shown by his action on his release, have been occupied with compunctious visitings, as justice commonly assumes; but his thoughts are of his ill-luck under the wide chances of escape of which he has had experience during all the time he has been at large before detection, and of how he may have better luck when he gets out. He is exhorted to be good: but the child of the mendicant or of the delinquent does not see his way to doing other than he has done before; and why should he while he feels his inaptitude of hand and arm for industrial work?

Under the common conditions of restraint, in the district schools, in the industrial schools, or in the reformatory schools—all of which, comprising some thirty thousand children, are now of necessity conducted on the half-time principle of varied physical and mental teaching—the pupil is placed under entirely new and opposite conditions, by which bad thoughts are excluded, and good thoughts induced and impressed from day to day by practical work, from the like of which he may hereafter get something good.

The didactic teacher cannot look into the mind and

see what effects, or whether any, have been produced by his precepts. But the drill-master or the work-master does see, in act and deed, the primary moral principles of attention, patience, self-restraint, prompt and exact obedience, in outward and visible action. The general result is that the pupil gets interested in what he does, and does it with a will. Hence the reversal of the long-time and small-school system, which, from the greater proportion of the parish schools, as I ascertained in London, sent 60 per cent. to the bad; and now, of children of advanced and hardened stages taken into the industrial schools and the reformatories, sends 80 per cent., and at the Feltham school sends 80 per cent. to the good, and in the District Orphan Asylums, working on the lower and less hardened ages, sends 90 and 95 per cent. to the good—largely to the good, as the returns show, in getting even second-class places.*

The teachers agree that what is now done could not be done by them on the common long-time system, and is only practicable with the factor of physical exercise on the proper half-time principle.

* The last return, from the Orphan School at Liverpool (1880), "shows 88 per cent. of boys and 84 per cent. of girls whose conduct was *known* to be satisfactory. Of boys only 1 per cent. was *known* to be unsatisfactory. The remaining 11 per cent. covered those who had either left their places or been removed by friends, and of whom nothing certain can be fairly stated except this, that they were generally heard of at various times, and for the most part were found to be going on satisfactorily. Of the girls 3·8 per cent. were not satisfactory, but of these 2·8

In the district schools children who have been criminals are occasionally brought in; and, from the experience in relation to them, the masters find that, instead of the bad affecting the good, the good predominate and affect the bad. Previous imprisonment is regarded as detrimental. On comparing the results of different institutions, considerable variations in the outcomes are observable, indicating differences of management, which, removable by an improved administration, would add considerably to the advance now obtained. In 1841 I was at pains to get at the poor-law administration of different educational conditions on workmen and on soldiers and sailors. The conclusions obtained as to the soldiers and sailors, were, that two tolerably well-trained men had the efficiency of three that were utterly untrained; facts highly valuable. But the practice was not continued as it ought to be, and its revival for these half-time schools will be of great benefit. If, however, the half-time principle receives its due extension, which is held by the most experienced teachers to be only a question of time and the improvement of administration, the great mass of

were in their situations. Of the remaining 12·2 per cent. the same remark applies as in the case of the boys." At Manchester, for several years, there has been a very thorough visitation of the half-time children in service, of which a report is presented to the committee half-yearly. In 1880, of 94 boys 1 was unsatisfactory, of 70 girls 2 were unsatisfactory. It is to be noted that on official investigation of the half-time schools, an important proportion of the pupils are found to have attained middle-class industrial and social positions.

the failures which these institutions are required to deal with will be obliterated.

Objections are made to sending children to these several institutions,—the district and the industrial schools and the reformatories,—on the score of the expense of their living. I know that the district schools admit of improvement in economy by improved central organisation and administration ; but, taking all the institutions as they are, they will be found to be means to a great economy of the immediate waste of mendicancy and delinquency, and also of a large economy by cutting off the hereditary successions of a wasteful population living on spoil, and by reducing the heavy cost of penal administration with which the country is now charged.

Action on the half-time principle of mixed mental and physical training, as applied to the destitute classes, may be set forth as action by the State in its parental position, on the old Hebrew maxim that “He who does not teach his son a trade teaches him to be a thief.” The prisons, now filled with delinquents, may be said to be filled with the victims of the neglect of that great maxim.

BAD MANNERS FROM THE LONG-TIME SYSTEM.

There is yet another point of serious failure, extensively displayed in the outcome of our small common schools, and indeed of almost all our long-time schools, namely, that our children frequently have bad manners and speech. It is the observation of Mr.

Mozley, the inspector of Poor Law schools, that "defects of general intelligence go along with defects of manner." To judge of this, we must try and see what our foreign neighbours say against us on this point. Speaking of the Anglo-Saxon generally, M. Dupont White says, "He approaches you as if he would fight you, and looks as if he would rob you." They complain of the *peu de délicatesse* in our ways. There is certainly great difference in the outcome of different schools, due chiefly to the different manners of the teachers. Military drill and discipline reduce much ruggedness and ameliorate the common manners; and this result might be further improved by the application of precepts set forth in the elementary work on *la petite moralité chrétienne*, taught with marked effect in some of the schools of France. The very popular pictures of common schools, of the mischievous tricks and annoyances of the children, and sly evasions of the master's control, are pictures of failures, which good half-time systems tend to correct, especially when the discipline is in the hands of fitting and well-mannered teachers, and when the infant-school organisation receives special attention.

OUTCOME OF THE LONG-TIME SYSTEM IN UNIVERSITY TRAINING.

For some time past the superior scientific instruction given in most of the German Universities has been pressed upon attention for emulation in England. But an examination of their common outcome will

modify opinions in relation to them. In some of our manufacturing towns where the living languages have not been taught in secondary education, the better educated Germans have been engaged to conduct foreign correspondence: and there they are carried along in the British course of business. But that course is more efficient than that of the German mercantile classes. By an eminent German member of a commercial house in London, who had been in business in Berlin, I have been assured that the transaction of business is about one-third quicker in London than with the higher educated classes in Berlin. The scientific and scholastic attainments in the German Universities are certainly very complete and superior; but the pupils are frequently detained there until their thirtieth year. My direct knowledge of the outcome in applied science, derived from sanitary engineering work, enables me to state that they are put to disadvantage as compared with the British engineers, who leave their schools earlier and get into practical work sooner. Stephenson left his school at fifteen, and other of the most distinguished engineers—and such early advances in the scientific professions are now common in England—were as early or earlier in the field.

At Owen's College, Manchester, and University College, London, there are classes of students who are really half-timers—that is to say, who are part of their day or on the alternate day in the manufactory or the place of business, and part of their time in the

college. The late Sir John Rennie challenged me to give an instance of one man, who had done any of the *works* to which the country owes its greatness, who had come out of the long-time University courses anywhere. In the Royal Engineers, where there is too much time wasted in the cloister studies, officers are in responsible charges five or six years before they would be after leaving the Universities in Germany. For the middle and the higher classes, as well as the lower classes, the maxim *Primo vivere deinde philosophari* is becoming more and more pressing for a closer formative education for remunerative service. As a matter of fact, those who are earliest out and amidst practical applications distance those who remain the latest in the University.

OUTCOME OF GOOD MANUAL WORK.

The outcome of the elementary education on the Continent, which has been commended for imitation, commonly presents similar results. At Zurich the whole of the instruction, the elementary instruction especially, is held forth as an example for imitation. But I know that English artizans have obtained such wages as five shillings a day for the same sort of work as that at which the native Zurich hands earn only three francs a day. The late Mr. Brassey told me that at only one small part of Germany did he get his work done as well as by the British workers whom he imported, and paid about one-third more of wages than the long-time-schooled German

workers received. The great majority of the existing schools are only parochial and small, whilst the correct half-time principle requires that they should be large, with special formative appliances of gymnastics, grounds, and swimming-baths, for physical training. The majority of the schools are parochial, and contain an average of about a hundred children, mostly under single masters; or single masters with a pupil-teacher.

The mastery of a new principle for application in public administration, as I can state from experience, requires much time and labour; and our higher political arrangements commit large branches of administration to changing party political chiefs, who come utterly unprepared to deal with the subject-matters of their departments (of which I could give amusing, yet sad instances), and who usually leave before they can become fairly acquainted with them, even if they have time to spare from party political questions. Under such official conditions, the permanent officers of departments, instead of working up to superior knowledge, work down to distracted attentions, to apathy, and antipathy roused by any troublesome new work, until they learn, as Dickens says, "how not to do it." The obstacles to the general application of the principle are, as I shall show, very serious, and need great determination, and strong special agencies to overcome them by new local organisations.

MATERNAL LONG-TIMERS AND SCHOOL HALF-TIMERS.


We have numerous mothers of small means who are compelled to act as schoolmistresses in the education of their own children. The mother of this class has her *crèche* on her lap, her infant-school pupil, and also her primary and secondary school pupil beside her, and she can only give to each a lesson in its turn, while she has to maintain order with several before the turn of each comes. In education she is of necessity only a "long timer." I have heard a wearied schoolmistress of this class observe, what a pity it was that for the purpose of education children were not born all at once, in litters, so that they might all be of one class for education, and receive simultaneous class lessons. The single schoolmaster of the village school has an assemblage of pupils of these disparate ages, families, capacities, and conditions to deal with, and to get on he must have usually six classes, to each of which he can give only direct instruction, the only effectual instruction, for about one hour in the day, that is one hour to each class. Whilst one class is being taught, the others must go on with their preparations and wait for their turn to be heard, and the master has meanwhile to repress impatient irritability and maintain order amongst them, whilst he is giving his lesson. The half-timer, who is taken into the single-mastered school, has to take his chance of getting one hour of direct teaching. In such institutions the half-timer

does not get on very well; but in the larger and fitting schools, where the aggregation of numbers enables segregations and classifications to be made, there would be one master to each of the six normal classes, who would give the one class simultaneous lessons. The pupil in such a class has no waiting; no time is allowed him for anything but attention to the master and the lesson set by him. He is as a soldier in the ranks under the command of the *sous-officer*, and has to keep pace with the rest. The pupil under these conditions receives as much attention as he could do under a single tutor.

I have gathered from school teachers of experience in different parts of England, and also in France, that the receptivity of different tribes or races differs considerably; that the receptivity in the northern counties, as in Lancashire, for example, is as three to two greater than amongst children of the southern counties; but that even the receptivity of these northern children of the elementary school ages is exhausted in less than three hours of direct simultaneous instruction, even if it be made, as it ought to be made, interesting to them. The half-timer, as we call him, is in reality more than a double-timer, in respect to the amount of instruction which he gains under simultaneous class teaching in the graded school, as compared with the pupil under instruction in the village or the single-mastered school.

CHAPTER V.

DRILL AS A PART OF HEALTHY EDUCATION.

HE subject of education and drill may be considered with exclusive reference either, first, to the future personal welfare of the individual pupil, on the assumption that his future career will be entirely in civil life; or, secondly, to the interests of the nation.

IN REGARD TO PERSONAL WELFARE.

In regard to the first topic, the welfare of the pupil in civil life, the case may be established by practical evidence.

Educational.—It is proved in the experience of what is called the half-time system, and of well-conducted schools where the drill is already introduced in combination with industrial training, that the tuition during the reduced hours of book instruction is at least as effective as in schools where the full time is exclusively occupied in book instruction.

It is proved that the hours of sedentary occupation in schools are generally prolonged beyond the capacity of the pupils for profitable attention, and that with a

view to mental as well as bodily improvement they must be reduced.

For occupation of the hours taken from book instruction, drill should be selected on these several grounds.

1. *Sanitary or Physical Minds*.—The drill is good (and for defective constitutions requisite) for correction of congenital bodily defects and taints, with which the young of a very large proportion of the population, especially the young of the poorer town populations, are affected; for these purposes of drill the climbing of masts and other operations of the naval drill are valuable additions to the gymnastic exercises of the drill, and when properly taught are greatly liked by boys.

2. *Moral Minds*.—For giving an early initiation to all that is implied in the term discipline, viz. :—

DUTY.

ORDER.

OBEDIENCE TO COMMAND.

SELF-RESTRAINT.

PUNCTUALITY.

PATIENCE.

3. *Economical Minds*.—Drill, when properly conducted, by giving suppleness to the joints,—rendering the action prompt as well as easy, and giving promptitude in concurrent and punctual action with others, adds, at a trifling expense, to the efficiency and productive value of pupils as labourers or as foremen in after life.

AS REGARDS THE NATIONAL INTERESTS.

On the second chief topic, namely, the interest of the nation, the general introduction of the drill is called for, and will be of the same use as it was of old in the parochial training to the use of the bow. On practical evidence of officers engaged in the drill, it is shown—

1. That the drill is more effectively and permanently taught in the infantile and juvenile stages than in the adolescent or adult stages.

2. That at school it may be taught most economically, as not interfering with productive labour, and that thirty or forty boys may be taught the naval and military drill at a penny farthing per week per head as cheaply as one man, and the whole juvenile population may be drilled completely in the juvenile stage as economically as the small part of it now taught imperfectly on recruiting or in the adult stage; and that for teaching the drill the services of retired drill serjeants and naval as well as military officers and pensioners may be had economically in every part of the country.

3. That the middle and higher class schools should have in addition to the foot drill the cavalry drill, which the parents of that class of pupils may afford.

4. That the drill, when made generally prevalent (without superseding), will eventually accomplish in a wider and better manner the objects of Volunteer Corps and of Yeomanry, which as interrupting pro-

ductive occupations now becoming more absorbing is highly expensive, rendering all volunteer forces small, dependent on fitful zeal, and ineffective. The juvenile drill, if made general, will accomplish better the objects even of the Militia. The juvenile drill will abate diffidence in military efficiency, and will spread a wide predisposition to a better order of recruitment for the public service; will tend to the improvement of the ranks of the regular force, whether naval or military; and will produce an immensely stronger and cheaper defensive force than the means at present in use, or in view.

5. And finally, that the means of producing this defensive force, instead of being an expense, will be a gain to the productive power and value of the labour of the country.

USES OF DRILL.

The use of the military drill in schools was pressed partly to obtain some physical training for the children, as well as for the cultivation in them of habits of discipline, patience, self-restraint, prompt obedience to command, and concerted action. The non-commissioned officers of the army were employed for the purpose of teaching, and an allowance for drill having been obtained from the Education Department, the drill has been established in about a thousand schools, with a reported good effect on the mental discipline of the schools which was fully equal to what was anticipated. In the district half-time schools there were added

to the physical exercises of the drill, when age permitted, the naval drill on the masts, swimming, and the exercises of the hand and arm in carpenter's work, shoe-making, tailoring, and gardening, and in some instances, the use of the steam-engine. For the girls the laundry work and baking were introduced. To the common military drill for the army, the skilled trainer Mr. Maclaren, of Oxford, added a considerable number of useful and practical exercises. For children various exercises have been added, with music and freehand drawing, making the course of schooling a course of pleasure.

The experienced economical result of this course of training in the half-time schools on the lowest types of children has been to give to two the efficiency of three for productive industry; to make the boys competent to earn three shillings a day of wages, or more, instead of two from the ordinary labour; to elicit intelligence and skill for the application of labour-saving machinery, and the cheapening of the cost of production.

In civil service, especially in sanitary service, I was much associated with officers of the scientific corps, officers of the Royal Engineers and Artillery and of the Royal Navy; Field-Marshal Sir John Burgoyne, Sir F. Head, and later on with General Gordon, with whom I was led to discuss many economical questions. I ascertained, as the experience of the School of Musketry, that only a low average of shooting was to be got from the common

rank and file as now enlisted; that a better average was got from the non-commissioned officers, and a better average still from the commissioned officers; in short, the skill in shooting rises, he found, with the intelligence. The best shooting was with the corps of Sappers and Miners, which is composed of skilled men who receive higher pay; and it was evident that the whole corps was, results considered, as cheap a corps as any in the line. The police force is a corps of men with a fair elementary education, who learn the drill better in a quarter of the time of the ordinary rank and file of the army. I estimated to Colonel Sir E. Henderson, the chief of the Metropolitan force, two regiments of his police as equal to three regiments of the Guards. "You do us injustice," said the Colonel, "we are worth more than that. I say that, results considered, notwithstanding the higher pay, the police force is the cheapest force in the country." This result of improved education is not disputed, but the general economical conclusion is that the mixed physical and mental training of children would add one-third to the civil force of the country, and more than one-third to its military power.

In a paper which I read at the United Service Institution on this topic, I cited evidence to show that if ships were worked with men selected for their intelligence they might be worked more safely with one-third less of force. I carried the investigation farther, in order to show that by the application of

these conclusions a considerable reduction might be effected in the expenditure on military force. This information went decidedly against long barrack detention, which, without occupation, or with only sham occupation, did not improve, but diminished discipline. And in a speech on the subject at the Society of Arts, I supported Sir Henry Coles' proposition in favour of a volunteer force like that of Switzerland, but with amendments.

My proposition was that as much as possible of military drill should be transferred from the productive juvenile or adult age to the non-productive infantile or school; that after that time encouragement should be given for volunteer exercises in the use of weapons, on afternoons, in the cadet stage, and after that further encouragement should be given for military exercises in the adult stages. I ascertained, on good military authority, that an average of one hundred hours of exercise in the year would suffice for a person to acquire and maintain skill in the use of the rifle. I proposed to get this by a double pay, or the day's pay of the policeman, for two hours of exercise on the Saturday, enlisting men on the condition that in case of a serious war they would join colours, and for the time go on foreign service.*

* Mr. Alexander Aird, sanitary engineer, of Berlin, establishes the fact by practice that of the soldiers trained in Prussia on compulsory enlistment and service for three years, from nineteen to twenty-two, they come out with an increased value, from

Remembering the axiom of Napoleon, that "in military service, whilst physique is as one, morale is as two;" seeing that in volunteer competitions the fast and the intemperate always go down before the temperate, I would only enlist for this volunteer service men of good moral character; I would admit no convicted drunkards, no uncertificated bankrupts, still less ticket-of-leave men, such as are found in the ranks of the army. The uniform of the volunteers would thus be a certificate of moral conduct and trustworthiness for civil work and social position. On inquiry amongst the volunteer corps I was assured that on such conditions a double number of volunteers might be obtained, and a more efficient force than had been seen on the battle-field since the time of Cromwell's Ironsides, for India and the colonies. This improved quality of force would be obtainable at a greatly reduced expense, if one day's double pay were given as against the seven days half day's pay. It would work out altogether at about half the existing army expenses, including a fortnight their training, of 30 per cent., which he and other engineers pay in wages. But we may show an advance upon that by experiences, that beginning with a drill in the infantile stages almost, or from five to eleven or twelve years of age, in the district half-time schools, the labour of the scholars receives an increased value realised on leaving school, by wages beginning at eight, ten, or twelve shillings a week, the former wages of adult agricultural labourers. These experiences prove that conscriptions in the adult stages of life and the losses to families of labour at that period may be dispensed with, and a drill given, in that stage, superior to any that can be got in the after stages of life.


or three weeks' exercises—required by Sir John Burgoyne,—as an acceptable “outing” for those who could be spared.

Sir Joseph Whitworth, an ally of mine in sanitation, was led to examine the economy of small arms and its effect on war; as of his small three or four-pounder gun, which, with a shell that opened with the fire of a company, had a range of not less than five miles. “What would I not have done with such an arm,” said Lord Clyde, “if I had had it in India.” Other implements are now being introduced by mechanists which will peculiarly require skilled and educated force to wield them. There is the improved Gatling, and there is an invention, the Maxim gun, which promises to give the fire of a whole battalion. “*Dieu aime les gros bataillons*” was the French maxim; but He loves them no longer. The great battalions, even our own squares, will all dissipate under the new machine guns, and the whole of the military tactics will have to be altered to an extent which baffles the old tacticians. The battle will be decided by science, skill, and capital; in other words, by the new education.

CHAPTER VI.

ON CONSTRUCTION OF SCHOOLS FOR HEALTH.

PRINCIPLES OF SCHOOL CONSTRUCTION.

N the construction of new schoolrooms, it is of importance that school boards should be apprised of the sanitary defects that require amendment in the greater proportion of the old elementary schools in this country. Medical officers of health have concurred in declaring that the common elementary schools have been the frequent centres of childhood epidemics. An excess of upwards of 7,000 deaths in the metropolis, and of upwards of 50,000 annually throughout England and Wales, in the school stage of life, were once pronounced, on the observation of the working of particular schools, to be largely attributable to the structural condition of the schoolrooms, and to the modes in which the children were kept in them.

The chief sanitary defects of schools have been, (1) Defective ventilation; (2) Defective warming; (3) Bad drainage and foul latrines; (4) Want of means of maintaining personal cleanliness; (5) Bad lighting; (6) Bad arrangements of desks and seats;

- (7) Want of proper means of gymnastic exercises;
- (8) Insufficient and ill-paved playgrounds. I would submit that it is important that school boards should require, in the competition for plans, that these evils should be first specially considered.

WARMING.

I will, in the first place, treat of the warming of schools, as that largely influences their ventilation. To me, it has always been most painful to observe the condition of children of the common schools, in winter time, going there in cold and wet, in driving sleet and snow, frequently ill-shod, and commonly ill-clothed—kept in the school with feet and hands painfully cold—fingers often so benumbed as to be scarcely able to hold the slates and pencils; the open fires at one end of the school, not freely to be approached, and when approached, the warming or heating on one side, “roasting in front and freezing behind,” so as to give inflammations or colds from the disturbed and unequal circulation. The confinement of the children for five or six hours in such conditions, overtasked mentally, and painfully constrained bodily, are surely evil conditions requiring active intervention for their relief.

One consequence of the defective warming is, that doors and windows are shut “to keep out the cold.” Then comes the pernicious effect of the confinement of the children in the atmosphere polluted by their breaths and by transpirations from their skins,

usually unwashed, or only hands and face washed, and from dirty clothes. As a relief, some of the windows are in part opened, and the cold air is let in for ventilation. The corners where this is done have been called "rheumatism holes." Sometimes when the windows are kept closed, the confined air is heated to an extent that creates perspiration, even in winter-time. Eruptive diseases are often the consequences of precedent functional derangements, and where there are outbursts of epidemics in children's institutions or in large schools, they frequently occur among the children grouped at one end, and the first case observed is a new-comer, who has been for a time the centre of the group attacked, the infected breath having been pumped out upon the surrounding children for several days before the eruption has appeared on the new-comer. Thus, in the ill-warmed schools, in which windows and doors are kept closed to keep out the cold air, foul atmospheres, poisoned by the incipient diseases common amongst the poor, are created for the children. In some weathers and school conditions, a mother in sending her child to such schools is sending it into a preparation of fever, or into measles-mixtures, or into small or chicken pox, or some form of disease. Children, thus infected in the schools, frequently bring the infection into crowded and ill-ventilated homes, where several sleep in the same bed. If surprise is expressed at the sudden extensive outbursts of epidemics in crowded habitations, here is one contribu-

tory source of them. Compulsory attendance in ill-warmed and ill-ventilated long-time schools is commonly compulsory bodily deterioration. Such conditions also endanger, and frequently ruin, the constitutions of teachers. It is proper to mention, as respects the higher class of female schools, boarding schools as well as second-class schools, that great pain is inflicted, and bodily disorder occasioned, by heads kept heated by unduly protracted mental labour, and feet kept cold by bodily inaction.

By graded schools, as I have shown, especially by half-time schools, three children may be taught well in half the time in years for the expense now commonly incurred for teaching one comparatively ill. The School Board for London have set an important example in the adoption of large school organisation. But such provisions entail the necessity of sanitary precautions; for if they be neglected, especially as respects the classes of children to be brought in by compulsion, considerable bodily injury will frequently be occasioned. I submit that the first object is to improve the method of warming as involving the method of ventilation.

Of the modes of warming, those by hot-water pipes and iron surfaces are of inferior, and sometimes, when for high heats, are of pernicious effect, and are very expensive. Besides, they are apt to warm only the sides of rooms, or the upper parts of them, and to leave the feet cold, unless an inconvenient and objectionable degree of heat is created over the

whole room. It is, moreover, matter of considerable experience that warming by earthenware surfaces, or stone surfaces, especially by heat diffused over wide earthenware or concrete surfaces, is more agreeable and more salubrious than any warming by iron surfaces.

Observing some ragged boys at night grouped upon a particular street-pavement, and apparently enjoying themselves, in very inclement weather, I found that the pavement on which they were assembled was warmed by a baker's oven beneath. It is observable that market-women, with a foot-warmer, sustain very inclement weather. The like facts, which I might multiply, appear to me to lead to the conclusion that there are no means of applying warmth that are so economical as by applying it to the feet.

The class of facts on this topic leads me to recommend that we should adopt the practice of two empires—of Rome and of China.

The Roman plans of floor warming are displayed in the remains of villas found in the chief seats of their occupation in this country. Their hollow floors were mostly made by square slabs of stone, or of large tiles, supported by stone pillars eight inches high, or a foot or more, set upon a lower stone floor. The upper floors were covered with concrete, and often ornamented by tesserae. Some of their hollow floors, in this country were evidently warmed by coal, from the remains of coal soot; in others they were warmed by wood. The fireplace, for the coal-warmed flooring,

was mostly a small cylinder of red earthenware, containing a mere hatful of coal, through which the air was led by a down-draught through the hollow of the floor, the draught being created by an upcast flue, on the side of the chamber opposite to the fireplace; the tall chimney-flue acting as the longer leg of an inverted syphon. In some of the largest Roman constructions of this species, the heat appears to have been led underneath by long, distinct channels. But in some the warming was by the diffusion of heat through the floors, amidst the uprights, which, I conceive, would be done by low heat, led slowly but long applied.

I am informed that in the barracks in China, constructed on the English principle of the open fires, men were frost-bitten, whilst the Chinese, with their mode, were perfectly unharmed. The Army Sanitary Commission of the United States adopted the principle of this method of warming for field hospitals. A trench, covered with wide slabs of stones, was led from one end of the tent to the other. On the outside, at one end, a fireplace was sunk at the mouth of the trench; at the other end a chimney was erected of clay, held together by empty barrels piled on end. In this way a draft was created underneath the stone floor of the tent, warming it in the most equable and agreeable manner. Americans, attached to the ambulance corps, applied the same principle, with complete success, to the warming of the field hospitals in Paris. General Duff, of the United States Army, informs me that he applied the principle, by

rough and ready methods, for the warming of field tents for his soldiers. The warmed floor, in its proper use, however, appears to me to have the peculiar advantage of supplying a colder and thence more condensed air, a better quality of air breathed than any heat-expanded air.

The effect of foot-warming is then to enable the body to sustain, with less discomfort, the impact of cooler currents of air. Foot-warming will, of itself, allow of doors and windows to be opened with less annoyance, and will be the more conducive to freer ventilation. Indeed, Mr. Blackburn's method of ventilating cattle sheds, by an open diaphragm along the roof, would, in some instances, suffice. In many others I would propose, in addition to the warmed floor, the introduction of open fireplaces, on Captain Galton's principle of warming with air pumped in that is fresh, as well as warm, and the more active removal of vitiated air through the smoke chimneys.

I have long advocated the principle of floor-warming, but I find it expedient to propose particular means for the purpose, which I will describe briefly later on, as architects may not have access to plans of the Roman methods of floor-warming.

VENTILATION.

Next to the foul air from overcrowding, and from the breath and from transpiration, there is the foulness arising from congregation of dirty skins as well as of dirty clothes. Medical officers who have to do the

work of vaccination with children of the lower and middle classes, are aware of how small is the proportion of them who are ever properly washed, and how painful, and, at times, how dangerous, is the duty of operating upon numbers of them consecutively in confined rooms. The great sanitary success of the district orphan schools is largely due to the daily ablution of the children, and to the cleanliness maintained in the clothing as well as of the persons. On visiting the Central District School I always found the female children's pinafores most perfectly clean, as if they had just come fresh from the mangle. On expressing a doubt whether this was not a luxury of cleanliness, I was corrected by the answer that three hundred soiled pinafores made an appreciable difference in the atmosphere. The answer expressed the sanitary principle of the importance of cleanliness—clean clothes, clean skins, clean air—as proportioned to the numbers aggregated. But the massing of numbers together, however cleanly, would be in some stagnant conditions of the atmosphere injurious, even if they were massed together in the open air. Troops marched in close column carry their own atmosphere with them. In epidemic periods it has been found that the proportion of attacks has been diminished by marching them in open columns, or widely apart. People faint in crowds, not from the pressure of the crowd but from the atmosphere generated by the crowd. Of course this evil is aggravated by filthy personal conditions. In one ragged school the health of the teacher was

frequently overcome by the stench of the scholars, and fever was frequent and rife among them. In self-defence he forced the boys to wash in an adjoining room; but this thinned his school, for the washing was with cold water. Cold-water washing is found to be a mistake in district schools where the children are under control. The circulation of children of the poorest classes is very low, and cold water is peculiarly painful to them;—besides, washing with water which is hard as well as cold does the work of washing imperfectly. It has been found that tepid water is necessary for the purpose. The master of the ragged school, to whom I have referred, got steam passed through the water and warmed it, and he then succeeded. The washing ceased to be disagreeable;—indeed it was made, as it always ought to be, agreeable.

In the larger children's institutions, where children are boarded, the effects of progressive sanitary improvement have been distinctly marked. In one, where the death-rate had been twelve per thousand, the foul air from cesspools and bad drains was excluded, the latrines were amended, and the ventilation was improved, when the death-rate was reduced to eight in a thousand. Next, regular tepid ablutions, with, in summer time, cold water bathing, and careful skin-cleanliness, were introduced, when the death-rate was reduced to three in a thousand.

PERSONAL CLEANLINESS.

If you go into even first-class elementary schools

in England whilst simultaneous class-teaching is going on, you commonly see dirty hands held up. If you go into a school of the like class in Holland, you see very clean hands held up. There, the moral, as well as the sanitary duty of personal cleanliness, as far as I saw of it, is well maintained. The children in the female schools are from time to time examined, and the duty of maintaining the cleanliness of their children is enforced upon the mothers. If any mother is frequently negligent, marked observations are made upon her, which are unpleasant. By due exertion in this direction, the object is very generally obtained. But there are cases where the children have no proper mother's care. In some places, the poor people are absolutely destitute of the means of cleanliness, or of proper supplies of water. Accidents constantly occur to little children: they fall down in the muddy streets, or dirty themselves in playing. To deal with these cases, there is, in well-appointed primary schools, as already shown, a female attendant on the schoolmistress, who takes the dirtied children into an apartment and washes them, the schoolmistress herself being of an occupation of a quality above such service.

On such experience, it is to be insisted upon that every elementary school should be provided with a retiring-room or closet, with warm water, and with the proper appliances for the cleansing of children. It is a provision of very great importance for the infant schools of the lower districts.

Of the lessons that may be taught in schools, the

practice of cleanliness is of the highest order. The clergy who neglect to enforce the precept, "Wash and be clean," fail in the enforcement of Christian duty. A filthy population is everywhere a low moral population, but it is futile to enforce cleanliness in the absence of proper appliances for its practice. All large schools should have one bath for teaching and practising swimming. For ordinary schools a swimming bath 30 ft. long by 10 ft. wide and 3 ft. deep may be made to suffice, and it should be constructed for about £50. But for one of the larger schools, there should be a bath 60 ft. long, 25 ft. wide, and 3 ft. deep, which should be made for about £200. In crowded districts several schools might be united for the use of one swimming bath in turns, as well as for one drill ground. The objection to such appliances on the score of expense is an objection to the means of economy, for all efficient sanitary appliances are means preventive of waste. The general economical waste of productive force in this country, as I have already expressed it, is as if a farmer, in order to obtain one working horse, had to raise two colts, and as if the horse, when raised, had only half its natural and proper working ability. The economical fact should be inculcated that a pig that is regularly washed puts on a fifth more flesh, and that flesh of a better quality than the pig that is unwashed; and that the same rule holds good with washed, as against unwashed children. Five washed children may be sustained on the food

requisite for four that are unwashed, to bring them up to the same condition. Besides, the washing itself is preventive of infectious and of contagious diseases, such as the itch and other diseases.

PLAY AND PLAYGROUNDS.

In the proper working of a school, with a due regard to the principles of physiology, as well as of psychology,—the body, as well as mind,—the children ought not to be kept long together. The reduction of school hours to the proper time for efficient teaching, which is demonstrated to be half the usual school time, is in itself followed by marked reductions of non-attendances on account of sickness. The children should, moreover, whenever the weather permits, be turned out frequently into an open space or playground for exercise, and in fine weather for lessons. Much may be said for the Irish hedge-row schools, as against the dens in which English children are frequently kept.

The common playgrounds for children are either the natural soil, which is very dirty, or a gravel, which is sharp and wasteful in the excessive wear of shoes and clothes; children fall down upon it and seriously bruise or lacerate themselves, and the sharp grit gets into their eyes or their lungs.

In one large institution, the managers could not be induced to improve the children's playground, which was of gravel, until after the prevalence of ophthalmia, when it was flagged, or paved with

York landing. It was then found that a saving of one-half the shoe-leather was produced by the new paving. But the paving with York landing is very expensive. A Val de Travers asphalted paving would be little more than half the expense, and would, with its peculiar elasticity of feel at the surface, serve much better, especially for gymnasiums. A tile paving, with concrete or selenite tiles, would be cheaper still, and these tiles, with the lock joints I have proposed and shall hereafter describe, would have the peculiar advantage of not being disturbed by "hop-sotch," or any other form of play. In Germany, smooth concrete paving is used, with considerable saving of shoe-leather. Where very good smooth paving of the quality in question is laid down, I do not see the necessity of children, or at least those of the poorest class, kept in public institutions, wearing either shoes or stockings in dry summer weather. If the feet be regularly washed and kept clean, I question whether they would not be better bare at such times. In Scotland children travel barefoot to school in all weathers, or carry with them their shoes and stockings, which they put on there, dry, in which there is reason.

A closet for drying clothes should be provided in elementary schools. Captain Johnson, one of the Queen's messengers, has advocated the use of sandals for soldiers, made of matted flax, such as are in use with great advantage by the peasants in the

Basque provinces. In those close neighbourhoods in urban districts, where there is absolutely no space for playground to be got, a flat roof should be constructed for the purpose, as is done with excellent effect in one large school near Long Acre.

CHEAP DINNERS.

As the efficiency and economy of teaching, by a division of educational labour among trained masters in graded schools, requires the children to be gathered from wider areas than heretofore, and from considerable distances, it will often be necessary to make provision of food for them. In the great middle-class school of the City of London, it has been found requisite to provide cheap dinners for those boys who do not bring their food with them in what the Rev. Mr. Rogers, the governor, calls their "nose bags." In the great metropolitan Jews' school, which provides for 1,700 children of the poorest class of Jews, and which is, in very important respects, a model of educational administration, I found that its leading supporters, the Baron Lionel de Rothschild and the Baroness, of their own munificent educational grants, have been accustomed to bestow on that one school £800 per annum, to provide a portion of bread and some milk to enable the very destitute and necessitous children to attend.

LIGHT IN THE SCHOOL.

There is yet another very frequent and serious defect in the construction of the common schools,

which requires to be guarded against, namely, the bad distribution of light. From a paper transmitted to me by the excellent sanitarian, Dr. Varrentrapp, of Frankfort, it appears that from the insufficiency of light, and from the bad distribution of light, in the schools in Germany, nearly a third of those who remain in them during and beyond the secondary stages are subjected to short-sightedness. Professor Leibrich, the eminent oculist, tells me that the injury is always done by the front light, and that the light should always be got in from the left side, and that in towns where such light cannot be obtained, it should be got as the next best from the back of the desk, and never from the front. A great deal of distortion and of curved spine is, as Dr. Varrentrapp shows, occasioned by the wrong adjustment of seats,—a topic, as well as others of the wall colourings and school fittings, beside my immediate purpose. I consider that schools ought to have more of window space; of windows made with double or with very thick glass, which is economical as saving heat, and is, moreover, advantageous, as lessening the transmission of sound from the streets.

SCHOOLROOM WALLS AND FLOORS.

For the reasons which now prevail in respect to the walls of properly constructed hospitals and cottages, the walls of schools should be made of impermeable materials, should be washable, and of a proper colour.

The evils common to the schools of this country are transplanted to our colonial possessions. In few of these schools, as Miss Nightingale observes, "is any attempt made at combining the elements of physical education with the school instruction, and even where this is done the measure is partial and inefficient, being confined to a few exercises, or simply to bathing." The obvious physiological necessity of engrafting civilised habits on uncivilised races with great care, appears to be nowhere recognised, except at New Norcia (Benedictine) School, Western Australia, on the return from which there is the following very important statement. Gymnastics are stated to be necessary to prevent sickness, and the reporter proceeds: "The idea of bringing savages from their wild state to an advanced civilisation, serves no other purpose than that of murdering them." The result of the out-door training practised at this school is said to have been hitherto successful "in preventing the destructive effects of this error."

With the advantage of some practical suggestions by Mr. Canon Cromwell, the Principal of St. Mark's Training College, I once directed a plan of one school, with the primary requirements, to be got out by Mr. Samuel Sharp, the architect, for 500 children, with the Roman floor warming by hollow tile floors, with solid concrete walls, and with a lavatory, but without a swimming-bath and without a playground.

The tile forming the hollow floor may be of concrete, or of earthenware, or of slate, tongued or rabbeted at

the sides, so as to fit into each other, and, when cemented, not to be easily shifted, or so as to obstruct the passage of highly warmed air or smoke, if accidentally loosened. The upright supports are made with tongues to lock in at the corners of the tiles.

The tile and the support used as a cross-tie will serve for the construction of walls, and attain more perfectly the sanitary ends I proposed for the hollow brick construction of the walls of houses. It may also be used for roofs as well as walls, in which case iron ties are to be used to give it cohesion, and iron uprights for bearing power, on the Crystal Palace principle. If walls of ordinary construction be made with non-absorbent surfaces, there may be sometimes unpleasant condensation on such surfaces, because they will be occasionally colder than the dew point of the air. If, however, contact of the outer air with the inner part of the wall be prevented by the interposition of a layer of confined air, the inner surface of the wall will never be much colder than the air of the room, and will not, therefore, condense moisture from it. The inner glass of double-paned windows does not become covered with hoar-frost for the same reason; the inner pane being nearly as warm as the inner air it remains clear when single panes are obscure.

The tiles, for this purpose, may be made of earthenware as well as of concrete, but most cheaply of concrete, which requires no burning, and most readily receives exactitude of form. With about one-sixth or

seventh of good Portland cement, or with General Scott's new preparation of lime, clay, and sand, called *selenite*, tiles and the supports may be made stronger than the common building stones. For leading the warmed air in any direction, and better diffusing it on admission, in place of the upright pillars, upright tiles with rabbeted joints may be used.

My friend the late Dr. Emile Braun, the Prussian archæologist at Berne, and Mr. Semper, the professor of architecture of Dresden, the architect of the Dresden theatre, men perhaps as highly versed in the principles of architecture as any in Europe, were of opinion that a tile construction,—if suitable tiles could be manufactured,—would be preferable to the hard burnt hollow brick constructions which I advocated, as means of getting rid of the evil of absorbent and damp walls. I concurred with them in believing that constructions on the principle of *cohesion*,—that is to say, on the principle of the Crystal Palace, only with opaque tiles instead of glass,—would in many cases have great advantages over the common construction, on the principle of *solid masses and weight*.

The same construction might be carried out for the roof of the house. As against wet, a coating of Val de Travers asphalt, which resists great solar heats, and is unflammable, would serve excellently, as also over much of other tile surfaces.


It is estimated that this construction can be made with tiles of Portland cement cheaper than similar constructions with the best solid brickwork with the

usual plastered and papered walls and wooden floors ; while it could be made cheaper still by one-third of selenite tiles.

A basement floor, warmed on the Roman principle, would, at an exceedingly cheap rate, diffuse an equable and pure warmth over the upper rooms, including passages and corridors, the great desideratum in house-warming. The interior wall tiles may be made of various forms, and with any amount of art decoration that taste or luxury may require ; and if of tiles, they may be made with porcelain surfaces. The permanence of such surfaces, and of the whole of the tile walls, is a means of large economy to be set against the periodical re-paperings and painting, and dilapidations of the common constructions.

CHAPTER VII.

PREVENTION OF EPIDEMICS IN SCHOOLS.

HE primary schools being common centres of children's epidemics, we framed in the First Board of Health, amongst the rules for the regulation of the duties of the local officers of health, as one of the duties, that the officer should regularly visit and inspect the children of the schools, and that when he detected premonitory symptoms in any child, he should separate it, and go with it to its home, and there give orders for its preventive treatment. The course in the home would be to separate the well from the ill; to give order that the child should be placed by itself in a room in a proper condition, and should have proper attendance and appliances, and that no one else should be admitted until after the disease had passed. It would follow that trained nurses should be appointed to visit the house, and see that the health officer's instructions are properly carried out. We had provided regulations of the duties of the officer of health, which included weekly visits and examinations of children, at the infant and the primary schools. In going over the school with him the schoolmistress would point out

to the inspector, or he would observe, the child with premonitory symptoms to be looked to—the cold shivers, the pains in the head—and would separate it from the rest, and go home with it, examine the state of the habitation, take order for the separation of the healthy children, direct the sick ones to be kept alone, and give the requisite directions for treatment. A trained nurse would follow with more frequent visits to see that the directions were complied with.

The regulations provided for similar visits and examinations of places of work; the separation of the workers, followed by visits to the habitation, and by the removal, as far as possible, of the injurious conditions found there. Had these regulations which we had prepared been duly carried out, they would have carried prevention to a great proportion of the excess of fifty thousand fatal cases in the school stages, in addition to the adult stages of life, of the classes the most scourged, and would have stopped the wide spread of the ordinary epidemics.

MODE OF STAYING THE SPREAD OF AN ORDINARY EPIDEMIC.

Meanwhile, until justice is reclaimed for the administrative service in behalf of the public, as much as possible should be called for by appeal for voluntary effort. Of what this may do in preventing the spread of the ordinary foul air epidemics, I will state the experience of a nurse of twenty years' practice as a specialist in dealing with the most infectious and

dangerous of these contagious fevers. Her chief practice was the common one in respect to all cases of the varied epidemics—to isolate the patient in a single room, the upper room if possible, and let no one else enter it ; to so arrange as to keep the door and part of the window open in order to let a current of air pass through the room over the patient ; to observe all the details of regulations as to the cleanliness of the patient and the articles of clothing and furniture, and the removal of excreta. As to her own personal protection, her practice was never to drink out of the same vessel that had been used by the patient, to wash from head to foot twice a day with tepid water, and to change her clothes each day. With these precautions, she had never had a single case of the spread of the disease to a member of the family or any one else during the twenty years ; nor had she once contracted the disease herself!

A collective example of the working of the principle provided for preventing the spread of epidemics is supplied by the Sanitary Aid Society, at Hastings, and at St. Leonard's-on-Sea, under the direction of a very able and energetic lady, Mrs. Johnston. At Hastings, on the early information of the occurrence of infectious disease, the health officer attends, and she follows and visits from time to time more than he can do, to see that the requirements as to the isolation and treatment of the patient are duly attended to by the mother or the female resident in the house, as it may be. The service is given which would have been

rendered, under our regulations, by a trained nurse visiting the patients at their homes instead of at the ward of a hospital. I am assured that the arrangement has the full efficacy we anticipated from our rule. As one example, it is stated that since it has been at work not an instance has taken place there of the breaking up of schools from the outburst of an epidemic. On the nurse's practice of the protection of herself by head-to-foot washing, I may note that two medical officers who had been through the most dire epidemics in the East stated to the Academy of Medicine that they ascribed their immunity to their careful attending to that practice. Presuming that the advocates of what is called the germ theory of disease could sustain their case, it is still believed by many observers, that a predisposition or nidus in the affected person must exist before the exciting influence can take effect. At the International Medical Congress held in London, Virchow's observations were strongly in support of this modified acceptance of what is called the germ theory of disease.

FREQUENT BODILY ABLUTIONS PROTECTIVE AGAINST EPIDEMICS.

If a great epidemic were to occur again, I would proclaim and enforce the active application of soap and water as a preventive. I have had frequent opportunities of observing this plan as a factor of sanitation. I may state that I have received accounts of it, showing its efficacy, such as this. In one orphan

institution, where the death-rate was twelve in the thousand, the cleansing of the place, the removal of cesspits and foul drains before the cleansing, effected in the death-rate a reduction to eight in a thousand. Next, a cleansing of the person was effected by a constant ablution with tepid water, and then a reduction by another third, or to four in a thousand, was achieved. Other experiments tend to establish the value of personal cleanliness as a preventive factor at one-third.

EPIDEMICS EXCLUDED FROM INSTITUTIONS IN GOOD SANITARY CONDITIONS.

It is to be borne in mind that our immediate object is the prevention of the spread of the foul-air diseases occurring on the lines of the ordinary epidemics. Sanitary Science has now evidence of the primary prevention of their occurrence. In institutions, such as well-managed district schools on the half-time principle, where the children's diseases, as they are called, are, as of primary origin, banished, a case of typhus has not been seen for many years; and in well-administered prisons, the walls of which cannot shut out the epidemics of a climatorial character, whilst they are freed from other contagious epidemics, the surrounding populations are ravaged by them. In staying the spread of the ordinary epidemics by home treatment, or treatment in small refuges, we are saving the sufferers from the vastly increased dangers which statistics demonstrate to be occasioned by collec-

tions of sufferers in the best-appointed and the best-managed huge hospitals.

It may be objected that the intrusion of house-to-house treatment will not be accorded ; but as a matter of experience I can state that the house-to-house visitations, which we ordered under a penalty, during the visitation of the cholera, were everywhere well received, and that we did not hear of refusals, or of any case for the infliction of a penalty. All, however, depends upon the manner in which the law is executed, and on the securities taken for the proper qualifications of the officers of health for the performance of the duties, set forth in the regulations. The expense of the personal for the requisite improvement in local organisation may be objected to by those who have still to be informed of the wastefulness of ignorance and of unskilled service. The extension required would be the attribution of some three thousand local health officers, who would be under the control of the Local Government Board, forming part of the greater local administrative force, including that for the relief of destitution, with which the Board is now charged.

Objections were made locally to the appointment of some seventeen thousand paid local officers, including medical officers, on the principles of administrative organisation, set forth in my report of 1833, on the administration of relief to the destitute. But by that expenditure the administration was, with all shortcomings, vastly improved, and an economy effected of more than one-half over the unpaid services

of the overseers and of the parish officers; such half amounting to upwards of four millions. Since then, by error in superior administration, it has been sent back, and the economies of the local taxation have been reduced. But here again I have the consolation of the vindication of principle by the recent reclamations of the representatives of the new local sanitary authorities (the Boards of Guardians), who have sent petitions to both Houses of Parliament, praying for a return to the more efficient administration of those same principles of 1833.

By the last returns it appears that the death-rate in the Indian army, which was formerly 69 in a thousand, was during the last decade 20 per 1,000; and that during that decade there has been a saving of life of 28,000 men, and a saving of force from sickness of about the same number,—a total saving of nearly double the British army at Waterloo. But no account is taken of the saving in money. It is an under-estimate at £100 per man, which makes the money-saving during the decade £53,321,700 for that period, an economy which may be commended to the attention of the Chancellor of the Exchequer, and to the House of Parliament, with the assurance that, with a due attention to past sanitary service, and to the improvement of its organisation, and effective position for the future—a yet greater economy may be effected. In further assurance of this, we may recall the partial economies of sanitation—the economies first achieved, as I have recited, by our

defences against the extraordinary epidemic with which we had to contend,—when the savings of the expenses of funerals from premature deaths throughout Great Britain must have been about as much as if the whole of the present population of the City of London, 50,000, were saved from being killed and interred separately. We may add to this the pecuniary economy of the saving of force by the saving of the health and lives of the second army in the Crimea, acknowledged to have been achieved mainly by the specialists trained under our Board. Altogether we may, I submit, claim credit for the collective economies of the past for the sake of the future—now especially—in claiming as a source of economy, if properly conducted, the relief of the population from the pecuniary burdens, direct and indirect, inflicted upon them by the continued retention of removable conditions of the ordinary as well as of the extraordinary epidemics.

GENERAL CONCLUSIONS FOR THE PREVENTION OF THE OCCURRENCE AND SPREAD OF EPIDEMICS.

I now beg to recapitulate the chief conclusions which the facts that have been before us in the preceding chapter appear to establish.

I.

That cases of small-pox, of typhus, and of others of the ordinary epidemics, occur in the greatest proportion, on common conditions of foul air from stagnant putrefaction, from bad house drainage, from

sewers of deposit, from excrement-sodden sites, from filthy street surfaces, from impure water, and from overcrowding in private houses and in public institutions.

II.

That the entire removal of such conditions by complete sanitation and by improved dwellings is the effectual preventive of diseases of those species, and of ordinary as well as of extraordinary epidemic visitations.

III.


That where such diseases continue to occur their spread is best prevented by the separation of the unaffected from the affected, by home treatment if possible; if not, by providing small temporary accommodation; in either case obviating the necessity of removing the sick to a distance, and the danger of aggregating epidemic cases in large hospitals—a proceeding liable to augment the death-rates during epidemics.

IV.

That the skilful and complete works of sanitation and the removal of conditions of stagnancy and putrefactive decomposition are the most efficient means of reducing the expenses of excessive sickness and of death-rates.

CHAPTER VIII.

THE ECONOMY OF HEALTHY EDUCATION.*

HE late extensions of constitutional government on the Continent appear to have brought men of influential position more closely in contact with ignorance, and impressed them more seriously than heretofore with the need of extended and complete systems of education as means of social and political safety and progress. The report of Monsieur Duroy, the late Minister of Public Instruction in France, on a general system of free national education is the most able State paper to be seen on the question. Austria, it is stated, has adopted a most liberal measure of national education. The existing systems of popular instruction on the Continent are being examined, and their chief radical defects are in course of correction. In North Germany, application is being made of the half-school time principle, of three hours' daily instruction in school, as a security against over bodily work in the field, and against over mental work and sedentary constraint in

* An address delivered before the National Association for the Promotion of Social Science on the opening of the session 1869-70.

the school. It is provided there that no child shall begin work until he is twelve years of age, and has been six years at school; that no child from twelve to fourteen shall work more than six hours daily, and that he shall attend school three hours daily. In France, a decree has been passed for the introduction of military drill and gymnastic exercises in all the Lycées, which comprehend 40,000 pupils. In Holland, this has already been done for all the secondary schools, and from experience of its advantages the opinion of the school inspectors and public opinion is moving for its extension to all primary schools.

At this time, I submit, we may look back and consider the aspects in which people of the lower class have hitherto been chiefly regarded for culture, and contemplate the past opinion of the dominant powers and their results to aid the judgment, at the present educational crisis of the starting-points to be taken up for the future.

By the theologian—though not of the school of Luther, or Knox, or Whately, but by the hierarchy claiming infallibility—man has been chiefly regarded as an immortal soul, whose culture was to be exclusively diverted to the world hereafter, but with a prostration of the understanding, and of the will, to what is proclaimed to be honour and glory to God—by the yield of tithes and offerings here. An Educational Commissioner of Italy informed me that in an extensive district, which swarmed with monks and banditti, there were not above 5 per cent. of the population who could

read and write ; but they had been taught their credos, and that was considered to suffice. By its fruits shall this hierocratic culture be known. The seats of its longest and strongest influence—Rome, Naples, Madrid—are now those of the most ignorant, the most licentious, the most beggarly, the most untruthful and degraded, the most savagely and unchristianly revengeful and bloodthirsty populations of Christendom. If there be now in our own cities a quarter occupied by a population sunk in filth and in squalid misery, ignorant, passionate, and dangerous ;—to be treated successfully only as children for the purpose of beneficence, but for peace and security to be distrusted and guarded against as enemies, it is precisely the population reared under that dominant hierarchical culture. Other opposite, exemplary, and truly Christian results may be adduced, as having been produced by the earnest religious culture promoted by other religious denominations, but it would be wrong to overlook the outcome of *that* denomination which irreconcilably opposes itself to the proved means of educational improvement proposed by the Minister of Public Instruction in France, to the advance of successful neutral educational improvement in Holland, and to the continuance of the successful improvement made in Ireland.

By the monarch, man was chiefly regarded as a “subject,” “untaught, uncomforted, ill fed ; to pine daily in thick obscuriation, in squalid destitution, and obstruction. This,” says Carlyle, “is the lot of the millions, *peuple taillable et convenable à merci et*

miséricorde. In Brittany they once rose in revolt at the introduction of pendulum clocks, thinking it had something to do with the gabelle." As to teaching, it sufficed that, being clothed in coloured cloth of a few sous the ell, the subject should be taught to turn to the right and the left, that he might fight for the honour and glory of the State, "*Et l'état c'est moi!*" said the *Grand Monarque*. The outcome of this culture is displayed by the economist Vauban, and is pictured by La Bruyère, as it subsisted immediately before the French Revolution; and I need not point out the extent to which such conditions, with as little regard for them, subsist at the present hour.

By the politician in our times—by the politician who rejected the power of understanding, by reading as a test for the exercise of the franchise—man has been chiefly regarded as a voter, who may be excited in any way, led by the ears, or moved by beer, to vote for the support of the party, amidst the madness of the many for the profit of the few. By the politician of both colours it was declared that the unschooled and unreading would make good votes—and that sufficed. The outcome of this politician's work is seen in the spread of corruption wider and deeper at each change, and in such vile political and social demoralisation as has been unveiled to scandal in Europe, in various inquiries in such places as Bridgwater, by my former colleague, Mr. Chisholm Anstey, and by his able and most praiseworthy fellow-commissioners.

But we here may now solicit the counsel of other and

scientific authorities, by whom man is regarded without sinister views, purely and mainly for himself.

By the psychologist man is regarded for study and culture as a thinking, reflecting, and reasoning animal, and by him, the psychologist, it is declared that the mental powers of attention, reception, and labour of cogitation are limited by definite laws, which are not violated without much injury, and are often grossly violated in all our old common elementary schools. Our most distinguished psychologist, the author of the greatest modern work on the Senses and the Intellect, Professor Bain, of Aberdeen, declares that there are there the hardest heads and the hardest workers in Britain, and that four hours of steady mental labour is as much as is good for them. If four hours be as much as is good for the hardest heads of young men, the laws of mind are violated by the common scholastic requirements of five and six hours' daily mental work for the soft and tender heads of infants and growing children !

By the physiologist man is chiefly regarded as an organism, subject to important laws for his rearing and conservation. By Professor Owen it is declared that the length of sedentary constraint of young children to five or six hours of daily desk work—that culture of the mind without culture of the body—is in violation of the laws of physiology, and that all excessive bodily work in the infantile stages is, during the later stages in the adults, injurious to the organism, by impairing its power and durability.

But for successful puericulture the aid of another

science, the science of the economist, which is concerned in the production of the material means,—the food and clothing of the orphan, the expenses of training and teaching, and the return for the outlay,—must be put in requisition to aid the science of the psychologist and the physiologist.

By the political economist, man is regarded for culture as an intelligent productive force ; and in another stage to which we are advancing, that of the general use of machinery, he may be defined, as my colleague Jules Simon, of the Institute, defines him, as an intelligent director of productive force, valuable to the extent and quality of its yield."

MAN AS AN INVESTMENT OF CAPITAL.

I venture, as a rudimentary economist, and as a humble servitor of the superior scientists, to claim a place in which I invite your consideration of man as an investment of capital, as a "pecuniary transaction," in relation to whom we have to consider the means of rearing him with a view to the return of the highest percentage of profit over and above the cost of his nurture as a return for that investment. I believe he will gain more by that mode of treatment than by most other current methods, that he would add to any other values he might have, and enhance his self-respect, and his estimation by others, if he could be led to consider himself in that point of view, and not "throw himself away," but study the conservancy of his force by temperance, and its productive application by attention and

skill. Isolated facts of the material order are entertained in the way of objection ; it is important that the complete facts of that order should have their position in support of progress. As a general rule, excessive sickness involves disability to work, premature mortality, loss of productive power, loss of capital. The sensual excess, occasioning enervation, which the sound theologian denounces as sin ; the depredation, which the criminalist condemns as crime, the economist may condemn also, but, in his view, as waste.

In aid of moral, religious, and sentimental convictions on the subject, especially with some minds with whom those convictions require support, I would beg to submit economical considerations upon it, the which, lowly though they may be, in their esteem ought really to be taken into account on the question of national interest and duty. The public and private waste from ignorance, from ignorance of physiology, or from the neglect of sanitary culture, is enormous.

In Glasgow, Manchester, and other hives of manufacturing industry, of all born, nearly one-half are in their graves before their fifth year, and those who survive do not last in working abilities much more than one-half the time that, with proper early nurture and continued economy, would be the full duration of their force. This waste of the national stock is as it would be with the farmer, if he had to rear two colts to obtain one working horse, and as if the horse when reared did not last in working and productive condition much above half its natural time.

I beg to exemplify more particularly the waste actually occasioned by neglected or by perverted culture.

The common average expense of any child from infancy for food and clothing, cannot in any district be put down at less than 2s. a week. At fourteen years of age he will have cost 70*l.*; but at the ordinary expenses of well-managed unions, he will really have cost more than double that, or 4s. 6*d.* per week; and at fifteen years of age he may be considered as an investment of £180 of capital economised for production. If from that period he remains a pauper, there will be thenceforward a loss of the return of wages necessary to replace the cost of his subsistence, and also a loss of the profit or payment to the capitalist, his employer. If the boy turns mendicant, he will thenceforth not cost less, but generally more, to the community, though the cost will be differently levied. If he turn thief, he will be maintained by the community far more expensively, for he will be maintained by spoil or in gaol. In whichever condition he may live, in prison or out of prison, the loss to the community for the remainder of his life, which from the adolescent stage would, according to the insurance tables, be at the rate of 40 years, would not be less than about £400, in addition to the original outlay during the infantile and juvenile stages. In the educational conditions which prevailed formerly with the pauper children under parochial management, and which still prevail extensively under the ill-regulated union administration, only one out of three orphans become productive members of

society, and the loss of capital to the public is not less than £800 upon every three orphan and destitute children thus reared. These educational failures, or the creation of those future objects of penal administration, correctly characterised in old English as "wastrils," still go on, from the default of legislative principle, at the rate of many thousands per annum. There are upwards of 20,000 always in prison, and regularly to keep up that prison population there must be more than 100,000 of them at large.

From the examination of runaway apprentices, it appeared to be a common cause, that the work they were put to was painful to them, so painful that they ran away at the first effort. By a change of system, simultaneous teaching to large classes, which can only be got together by aggregations of numbers, on the half-time system, and by physical training, which imparts aptitudes for labour, entirely different results are obtained, and now the children of that class are readily taken into service without apprenticeship fees, and the moral failures, that is to say, what I call moral failures, the failures to get into places of productive service, and to keep them, are utterly inconsiderable. We may now safely undertake that, give us young the children of hereditary mendicants and delinquents, and we will confidently undertake that the vicious succession shall be broken, and that they shall be mendicants and delinquents no longer, but honest labourers and producers. We can show where, with combined physical and mental training, this is done.

This physical training under a proper elementary system begins in infancy, and in teaching children the use of their fingers, in plaiting, little modelling by the German method of the kindergarten, which you may see at the Home and Colonial and other model schools. The instruction of the hand and eye is continued in an advanced stage by teaching elementary drawing, which is done before the tenth year and a half. The military and other naval drill teaches them prompt attention and simultaneous movement, lifting together, pulling together under, using their hands and arms and legs. Superadded to the military drill it is proved that systematised gymnastics give to three the efficiency of five for all purposes of ordinary labour.

Let me expatiate somewhat on the economical gains specially derivable from such culture. At present, by rude and accidental circumstances of physical and domestic conditions, a large proportion of our population obtain presumably a valuable though imperfect physical training, which ought not to be interfered with, but rather accommodated and promoted. It begins with errand going, parcel carrying, dinner carrying, water fetching, pumping, the use of the broom, the shovel, and the like—all of which I regard with respect, and consider that the scholiast ought to be taught to do so too; for work, negatively by the exclusion of the vice of idleness, is to be regarded as morality. Howsoever it may arise, the fact is that, with all his default, the British labourer may be set

as the foremost in the world, except some North American or New England labourers who keep pace with him. Two English labourers are equal in efficiency to three Norman labourers, or to three Danes, or to three Norwegians, or to three Swedes, or three Germans. Therefore, though his wages may be a third higher, the result to the capitalist is the same, and he saves in time, moreover, and in labour of superintendence and certainty of result. Mr., now Lord, Brassey, who has made railways in France, in Italy, in Germany, in Russia, and in India, has told me that, with the exception of about 10 per cent. in one part of Germany, and about 40 per cent. in earthwork in India, he found the higher priced labour of England as cheap as any in the world. Other engineers have given me the same information.

Now, what is the economical result of two having the efficiency of three? It is that you save the food, the clothing, and the house-room of the third—in fact, that you save a third capital, or create a fund, which may be divided as extra wages between the other two, as in point of fact it is to a great extent, leaving some extra profit to the capitalist. In the generality of this condition a third population is saved, and the same economical strength maintained. I believe it is owing to this superiority of its labour that England is economically equal, if not superior to, France with her larger population. But of this extra wages, our labouring population spend some £60,000,000 per annum in stimulants, three-fourths

of which they would be better without. What may not be expected from a population to whom an improved education imparts temperance and frugality; —and, more of self-estimation! Whatsoever moral or other worth a labouring man may have, the agricultural labourer may be told, for his self-estimation and care, that he has invested in him the capital of a first-rate team of horses, or of two hunters; whilst the artizan may be admonished that he has in him the capital of a twenty-horse-power steam-engine.

In a national system of education, in the economical point of view, the practical maintenance, and the improvement of the economical efficiency of the stock of labour of the country, are to be regarded for the production of net economical results. We ought all to be economically elevated by a national system of training and education, so as to pass as honoured and “discounted bills” of our several real values. For this purpose, and for all national purposes, instead of sacrificing labour to the behests of the school, as educationists commonly demand, the school teacher should be required sedulously to study and accommodate himself to the behests of labour, of domestic and other productive occupation, which he has hitherto neglected to do. It is a primary principle of the economical reform of education, that earning and learning should be carried on as closely as possible, at the same time, on the half-school time principle. For this purpose a balance has to be maintained between body and mind, and over bodily work and

under bodily work ; over and under mental work has each yet to be avoided. My colleagues of the Factory Commission of Inquiry made a first step in this direction. We laid down the principle that to work a young child the same stages as an adult was, as the physiologist agrees, injurious to the working stock of the country, and was economically as wasteful as working a young and growing colt the same stages as a full-grown horse. I had charge of the Bill, and inserted the provision limiting the infantile labour to six hours' daily task, leaving the employers to provide double sets to keep pace with the adults. How, it was objected, could we prevent the child who had worked part of a day in one set, being taken in another name to another factory to work in another set during the same day ? In answer, I pointed to the provision which was required as a condition to employment, that the child should produce a certificate of his having been three hours a day in a school the week preceding. Whilst this compulsory provision is a security against overwork, it is at the same time a security that three hours at the least shall be taken from the adult stage of work everywhere in favour of the growing child, and it is, moreover, at the same time, a security against exclusion from education. Where the provisions of the Act are carried into operation, it has answered our efforts most satisfactorily. Under it there are fewer deformed and stunted workmen than formerly ; it has preserved the working population from much deterioration by overwork ; and it has also, by the half-school

time, under proper teachers, been the means of imparting an extent of elementary education in the three hours' teaching, equal to that imparted in the national schools in six hours.

EDUCATION IN RELATION TO INVENTIVE ART.

The great progress of mechanical inventions and of labour-saving machinery, now, however, reduces our advantages, in the amount of physical power and energy of our wage classes. It gives an advantage to the weaker but better educated foreigner, as an intelligent director of force, *i.e.*, of machinery. The English labourer has hitherto in great measure made up the defects of his education and his want of general intelligence, by his exclusive devotion to one thing, to one subdivision of labour, to the working of one machine. But now the changes of machinery more than ever necessitate changes of occupation, and the revolutions of countries will often change the seats of manufactures. An improved technical and art and science education is needful to enable the British artizan to learn quickly to direct the new forces, to enable him to change also, and to keep pace with them and advance his position.

Educationists and the public generally are unaware of the grievous failure in intelligence of the British workman in the direction of such force as he has already to deal with, and of the great loss of life and limb that is occasioned by it. Our losses from violence amount to an average of 11,000 per annum

in England and Wales. Of these about 5,000 are reported as having been occasioned in the use of steam power and machinery. Sir William Fairbairn has, perhaps more than any one man of science, investigated the causes of the steam boiler explosions occurring in Lancashire, and he has declared that they have, for the greater part, been occasioned by the ignorance or the clumsiness of the hands to whom they were intrusted, and to the want of scientific knowledge and of general intelligence. Other evidence is to the same purport. The frequency of such events, their separate occurrence, their sameness as newspaper paragraphs, brutalises us, and destroys our conception of the aggregate amount of the evil. Five thousand killed annually! Why, that is five times the annual number of men who were slain outright in the field or on the deck during the last twenty-one years of war! What should we think if more than half the police force, or all the Guards, or more than four times the number of the Lords and Commons were brought together and visibly blown to pieces, scalded to death, crushed to death, and presented to the sight, with the agonised bereaved friends and relations? And yet this is one sacrifice to ignorance, bodily clumsiness from defective training, which we have to remedy. And here is another. By the absence of mothers, or by their occupation with labour—by the want of infant schools, there are about fifteen hundred children burned or scalded to death every year.

I have spoken of the general labour and productive power of the wage classes of the country, being as three to two against most continental labour. But by the improvement of the general physical training of the population under the half-time system, we may effect an improvement upon ourselves, by imparting, as is proved, to three the efficiency of five, for all purposes of ordinary labour. Such an improvement of the working stock of the country, such an augmentation of its productive power, is a result which, I submit, would justify the application even of a national rate if it were necessary to obtain it, as a means of a great national economy.

In conclusion, I now submit that the value of land or rent rises to a greater or lesser degree with the skill of the labour exercised upon it in accordance with the old maxim, "*Tant vaut l'homme, tant vaut la terre.*" That nothing is so wasteful as ignorance, wasteful of capital from inaptitude and unskilfulness; wasteful from idleness; wasteful from mendicity, from delinquency, from depredation, and from spoil. That by an improved mixed physical and mental training the capital, invested in human beings, may, by increased aptitude, be rendered more productive in every way, and the periods of working ability or its productive duration be extended. That increased aptitudes will be imparted for meeting changes of occupation on the failures of particular sources of demand. That over-burdened labour markets will be relieved of redundant hands, and net wages augmented.

That any increase of educational rates wherever needed will, under a correct administration, be a means to an economy. And, that by a complete elementary education, on the principles stated, the productive power of the country may be augmented by one-third.

But the greatest and grandest advance in the power of sanitation is denoted by the separately-examined experiences of the district half-time schools, where the chief children's diseases are, as displayed in these separate experiences, extinguished amongst those children who enter the school without developed disease upon them, and where the death-rate is reduced below 3 in 1,000, less than a third the death-rates of unprotected populations outside. Dr. Guy, the late medical officer of the Prisons Department, has stated that, as a class, criminals are of a low physique, and that a large amount of the crime for which punishment is inflicted is due to insanity and to a low physical condition, which sanitation, by early physical training, would remove. There are experiences which show that, by physical training on the half-time principle, 90 per cent., comprising a large proportion of such children, are got to the good. Dr. Ashe and other specialists declare that, as a class, lunatics are of low physical condition—an important matter while 80,000 of them burthen the rates. Of 30,000 blind persons, the late Dr. Rolph declared that two-thirds might have been saved by early sanitation.

PART III.

THE HEALTH OF THE COMMUNITY.

(*SOCIAL HEALTH.*)

PART III.

THE HEALTH OF THE COMMUNITY.

CHAPTER I.

THE SUPPRESSION OF INTemperance.

WITHOUT being literally an advocate of total abstinence from alcoholic drinks, I have been, from the first days of my life, an observer of the evils incident to the use of those drinks, and a strong friend of the politicians who would restrict their indiscriminate adoption as beverages.

It is just to observe that some legislation which has of late come into operation on this subject, as it would seem independently, had its origin from me. This fact will be shown from one or two striking instances in another chapter.

The first time on which I appeared in the field in connection with the question of intemperance, was as a witness before the Select Committee appointed by the House of Commons to inquire into the subject of drunkenness. This committee, with Mr. J. Silk

Buckingham as its chairman, held its sittings in the year 1834.

The committee was the first of its kind, and appears to have been looked upon, in its day, as something extremely anomalous, fanciful, and Utopian. One of the commentators on the labours of the committee, after they were published, reported that when the proposition was first submitted in Parliament to make the intemperate habits of the people, and the causes and consequence of general indulgence in such habits, the subject of legislative inquiry, it was received with derision; and when the noble lord the Chancellor of the Exchequer was first asked by a deputation from Ireland to give his sanction to such an inquiry, he expressed his doubts whether, even if it were moved for by any one member, a single other person in all the House could be found to second it. In his opinion, a proposition to turn St. Stephen's Chapel inside out would be just as likely to meet with support.

The Chancellor of the Exchequer, although he exaggerated the difficulty, was not, as it turned out, very wide of the mark. The first hundred of the petitions presented to the House of Commons, praying for legislative inquiry, with a view to devise a remedy, were received with a levity which showed that a want of acquaintance with the subject was almost universal amongst the members of the Senate.

The petitions, nevertheless, continued to pour in; the discussion which was elicited upon them drew out some shocking details of the evils of drunkenness;

and, at last, the motion for a committee of inquiry was carried by a majority of sixty-four against forty-seven. But even when the committee was appointed, there were many of its members who did not deem the inquiry of sufficient importance to demand their attendance; and there were others of it, who entered on the investigation with feelings of doubt as to any beneficial results arising from their labours. Day by day, however, the facts which continued to come out assumed an increasing public interest; good and thoughtful and well-informed men gave their evidence without reserve; the committee sat until the close of the session; and when, at the end of its labours, the mover of the committee delivered himself upon what had been done, his speech created so marked an impression, that a revised report upon it was generally called for, and the verbatim copy of it, as reported in the *Mirror of Parliament*, was reprinted in London, and, subsequently, in various parts of the country. Of this address, during its various editions, more than a million copies were sold, and, in several instances, public meetings were held in the provinces, at which the speech was read to many thousands of hearers, and resolutions were passed supporting the views which it expounded.

All the political work for the removal of intemperance may be said to have had its commencement in the labours of this remarkable committee, and in the admirable evidence which it drew forth in its sittings between the 9th of June and the 28th of July, 1834.

The names of the men who supplied the facts come before us now as historical names in the temperance cause. The Rev. John Edgar, of Belfast, Dr. J. R. Farre, of London, Mr. William Collins, of Glasgow (father of the present Sir William Collins), Mr. Joseph Livesey, of Preston, called the "Father of Temperance," who died in 1884 ; Mr. John Poynder, clerk of the two hospitals of Bridewell and Bethlehem, and many more made their first prominent appearance in these Parliamentary minutes of evidence.

I had also the honour to be called in and examined on the 11th of June, 1834, and I am now the only one, I believe, of the committee or witnesses who survives. I was then a barrister. I did not volunteer my evidence on the subject because of greater knowledge, derived from my own perception of the prevalence of drunkenness amongst the labouring classes, than most individuals possess who observe the people in the streets through which they pass, but from evidence communicated to me incidentally, when acting as one of His Majesty's Commissioners of Inquiry into the Operation of the Poor Laws, and as one of the Central Board of Commissioners for inquiring into the operation of the Laws for the Regulation of Labour in Factories.

THE INFLUENCE OF INTEMPERANCE ON THE PRODUCTION OF PAUPERISM.

My evidence, derived from the sources specified, had special reference to intemperance and pauperism. It was derived from inquiries extended through

the metropolis, and through the counties of Berks, Sussex, Hertford, Kent, and Surrey, and through the agricultural parishes adjacent to the metropolis. It indicated that the habits of drinking, common to those who received out-door, as well as those who received in-door relief, were most developed amongst the out-door population. In the London parishes a considerable proportion of the out-door relief was spent in the gin-shop, immediately after the pauper had departed with his money from the pay-table of the parish. In St. George's, Southwark, it was discovered that £30 out of every £100 of money given as out-door relief was spent in the gin-shop during the same day. In another parish one publican stated that he received £2 more for gin on Board days than on any other days. It was further shown that one of the most mischievous things the Legislature ever did was the reduction of the duty on spirituous liquors.

A little later on in the evidence I tendered a statement which has, of late years, been often repeated, namely, that the great number of houses in which intoxicating liquors are sold is a common cause of intemperance and of the pauperism which springs from it. It was stated by witnesses in the counties that the number of beershops had, undoubtedly, that effect; that the workman when he came home from work, in passing through the village where there was formerly only one public-house, had now to run the gauntlet through three or four beershops, in each of which were fellow-labourers carousing, who urged him

to stay and drink with them, and that he must be a remarkably steady man who was able to overcome these solicitations.

The same view was extended to the drink shops in the metropolis, especially to the ginshops. Any constant suggestion or provocation, by display, to persons whose appetites were not well regulated had the same effect. Those who expended so much capital in gorgeous decoration, calculated to arrest attention, *must find their account in it*. In regard to the number of these houses necessary for a reasonable supply of drink for health and refreshment, I contended that any supply whatever, of gin, was greater than the necessity required either for health or for refreshment.

These truths, told more than half a century ago, require, unfortunately, to be retold in this day, and as often as ever. Still they who expend so much capital in gorgeous decoration of the ginshop, calculated to arrest attention, *must find their account in it*. And what were shops in 1834, are "palaces" in 1888.

Touching the effect of the expenditure of out-door relief to the poor in the purchase of drink, I entered into further detail; and in relation to the question whether the increased amount of poor's rates, occasioned by drunkenness, was greater than the gain to the revenue by the spirits consumed by such persons, I answered, that so far as it related to the consumption by the pauper classes, that, of course, must be the case. Of the causes of pauperism, I attested that the almost universal evidence throughout the town parishes

represented the main cause of pauperism to be reckless improvidence, chiefly manifested in excessive indulgence in drink, and that a number of the persons who were receiving out-door relief were persons who, by drunkenness, were rendered incapable of supporting themselves.

Referring to the efforts which were then being made by the Poor Law Commissioners to abolish the indiscriminate out-door relief which disappeared too often in gin and beer, I had to explain that the opposition to the reform was not confined to the poor alone, but that the publicans and their superiors, who were the losers by the reformation, took their part in it. In the town of Cookham the change was stoutly resisted, chiefly by the instrumentality of a considerable brewer. This man headed the opposition to a change of system, and bought up the smaller shopkeepers, and all who were under the influence of the publicans, to resist the beneficial change that had been introduced. After the change, its operation was manifested in an increase of sobriety, and then the opposition rallied. Not a word was uttered of the loss to the beer-sellers from the change. Not a word was uttered that the ground assumed of pure sympathy for the paupers was the same as that of other officers who, deriving considerable fees and emoluments from the existing practices of law in relation to bastardy, opposed a change of law on that subject from an assumed sympathy with the victims of seduction and a dread of increasing moral evils.

The selfish side of the argument in favour of the

indiscriminate sale of intoxicating drinks was exposed for the first time, certainly, on evidence which admitted of greater proof as to its correctness than had previously been supplied by any authoritative statement; and this evidence was of itself so clear that it stood of itself without comment. Some of the other witnesses against alcohol were moved greatly by enthusiasm; my reasoning was purely from data patiently acquired.

CHAPTER II.

PRACTICAL REMEDIES FOR INTEMPERANCE.

IN continuance of my evidence on intemperance I was struck, I told the committee, with the observation that in Scotland—so remarkable at that time for Judaic observation of the Sabbath—there was more intemperance than either in England or Ireland. In England, half a gallon per head was the allowance of ardent spirits annually consumed. In Ireland, the allowance was one gallon; in Scotland, the allowance was two gallons. This fact, with many others which I had collected, led me to suggest that restrictions upon innocent amusements and pleasures during holidays might, with advantage, be removed, and that if they were removed, there would be less drinking on such days. In the rural districts, as well as in the vicinities of some of the towns, I had heard very strong representations of mischiefs from the stoppages of footpaths and ancient walks, and of extensive and indiscriminate enclosures of commons which were previously used as playgrounds. These curtailments of means for innocent recreation drove the men to the public-house as the only remaining place of entertainment. The evils extended to a still

greater extent, for they affected the younger members of the community. There were no sufficient playgrounds for the children, who, therefore, instead of playing in the fields and commons, were to be seen assembled at cricket or other games in narrow, dirty, or dusty lanes, and on the roads through the villages to such an extent, that it was often difficult, in driving along, to avoid running over the children. This confinement of the young to the streets and alleys of crowded towns brought them, in their earliest days, when their minds were most impressionable, into communion with people and with conditions of misery which it was most important for them to avoid; while it kept them from communion with the broad and beautiful and healthful nature which it was most important for them to approach and appreciate.

In order to prevent the evils produced by the errors thus detected and described, many suggestions were tendered to the committee.

RECREATION *versus* INTEMPERANCE.

It was proposed that the means of gratifying the desire for all innocent recreations and enjoyments should be freely thrown open without any kind of bigotry, prejudice, or fear. Practically, this advice amounted to that extension of privilege to the working classes which has been asked for so earnestly, but unsuccessfully, in the present day—the entrance on Sundays into museums, galleries, and other places of intellectual pleasure. I, for one, argued then as I

do still: wean men and women by all means possible from the gin-palace and public-house; let the builder of the gorgeous drinking house no longer have the gorgeousness to himself alone; let him feel that he has a rival of a better and a purer kind, and the competition, be it ever so slow on the part of his rival, will be beneficial in the end.

EDUCATION *versus* INTEMPERANCE.

In furtherance of this same reform amongst adults, I dwelt also on the effect of education of the masses as a counteracting agency. With respect to the manufacturing classes, it appeared to be acknowledged, on the concurrent testimony of all considerable employers of labour, that the best informed of their workmen, the best educated, were, uniformly, the most sober and valuable. The absence of education was, commonly, attended with an incapacity of husbanding wages and of using high wages. Under such circumstances, high wages were injurious rather than otherwise—the uncultivated and improvident having no idea of economy, nor of laying by for times of need. Stagnation to them meant ruin; a fall produced the sensation of a tax; a rise drove them into sensual excesses, excesses fatal to the health, industry, and contentment of all who for want of education had no fund of self-amusement, and no refined tastes to gratify.

With evidence of this nature in hand, it was impossible to be too earnest on the matter of utilizing education for the suppression of intemperance. In

the course of inquiry under the Poor Law Commission, most striking instances of the effect of a good education in producing frugal and temperate habits were observed. Pauper children, to whom a good education was given, got into employment, and rarely returned or became burdensome as adults; while other pauper children to whom a bad education, or no education at all, was given, were continually burdensome, and became drunkards, prostitutes, or thieves. It was submitted, therefore, as deserving the consideration of the committee, whether sober habits may not be efficiently promoted, indirectly, by the formation of cricket grounds and public walks; by horticultural gardens in the neighbourhood of the smaller provincial towns; by the institution of zoological repositories in the neighbourhood of the larger towns; and by the free admission of persons decently dressed into such institutions on Sunday after the morning service.

COTTAGE GARDENS.

Another method for weaning the ignorant populations from drink and habits of drinking, was a recommendation of the pursuit of gardening by the poor, on allotments of cottage gardens of about a rood to each person, but with the provision that there should be no extent of allotment beyond what might be cultivated during spare time as an amusement, without inducing a reliance divided between the produce of the allotment and regular labour.

HEALTHY HOUSES AND COMFORTABLE HOMES.

Again, in respect to adults I urged, as a much needed means of reformation from intemperance, that the homes of the working people, agricultural and mechanical, should be improved so as to be rendered more comfortable and attractive. If the home can be made healthy and comfortable, the battle against the too comfortable public-house is half won. This was a point which I tried to impress forcibly. It was not a new point, and I did not claim it as such; but in those days it was a subject which had received so little attention, that it sounded, no doubt, both new and strange. We are fighting the point yet, backwards and forwards: backwards, towards drink as the cause of the miserable home; forwards, towards improvement of the home as one device of cure for the drink evil.

RESTRICTION OF DRINK-SELLING CENTRES.

The idea of suppressing intemperance by limiting the public sale of intoxicating drinks was another point enforced. The witnesses in the country whom I had examined were very generally agreed that drinking on the premises of beershops should be prohibited, and although it was admitted that in many instances such a regulation would be evaded, it was contended that it would be extensively effectual if a circle of a given radius were drawn round each beerhouse, and drinking of any beer from the house were prohibited within

that circle, that is to say, drinking on the premises. The beershops in the bye-lanes were commented on as specially dangerous refuges of the most depraved members of society.

INCREASING THE LICENCE DUTY AS A RESTRICTIVE MEASURE.

On this topic I spoke with the same kind of reserve as that which we still hear from many reformers, who hold that the check to intemperance must be by moral, rather than by legislative and restrictive measures. My reasons, as they were stated at the time, were, that considering how large a proportion of the labouring people are deficient in the habit of self-control, or the power of resisting immediate gratifications; how many of them are in a condition in which an advance in wages is equivalent to an increased supply of drink; how strong are the interests involved in furnishing the supply; and how inadequate is the power of the local police to carry out an efficient system of restriction; more would be done by education, by the substitution of innocent for gross and noxious modes of excitement, and by facilitating cheap and harmless modes of amusement, than by legislative restrictions.

At the same time I submitted that the proof of absence of self-control ought to constitute a case for legislative interference; and that restrictive measures might be resorted to concurrently with other measures, to influence the habits of the people.

SUPPRESSION OF PUBLIC-HOUSES AS PLACES OF
BUSINESS.

An evil which I declaimed against was the use of the public-house as a place for the transaction of various items of public business. Admitting the difficulty of carrying on the work of a benefit society in places where the public-house is the only place convenient for holding the meetings, I suggested that in every such case the drinking fines should be abolished, and that the want should be supplied by some room in every village or locality, such as the village schoolhouse, for holding meetings of benefit societies, banks, and clubs of various kinds.

ENCOURAGEMENT OF THE USE OF LIGHT BEVERAGES,
AND OF COFFEE TAVERNS.

In order to temper intemperance, I suggested that the people should be enabled to obtain the lighter wines of the Continent. I had heard a complaint that on holidays there is scarcely any alternative for those who were disposed to be temperate between drinking cold water and drinking strong fermented liquors, and that consequently the strong drinks were taken. I had also heard of Englishmen, of the working class, who, on the Continent, had contracted a preference for the lighter beverages in use in the country, the lighter wines, or the orgeat, or other beverages. The evidence of a working man named Edwin Rose was specially submitted in proof of this view, and

his regret that there could not be some sort of free trade between France and England so that cheap French wines could be brought over here and sold as cheaply as table beer. In the same direction of suggestion the sale of good and wholesome coffee in the metropolis, and other large towns, in well-regulated coffee-shops, was put forward as an important measure of advancement.

Since this evidence was delivered, both the suggestions it offered have been brought into partial operation. The light French wines, as they are called, have been introduced, and the coffee-selling movement has been greatly favoured. The first has not been followed with the good results of checking intemperance which were expected of it, for wine is wine, be it ever so light, and once tampered with begets the desire for itself in the heavier form; but the coffee movement has been more successful, and is attaining greater success day by day.

WORK AND STRONG DRINK.

There was one remaining topic in my evidence which must be noticed before I close the chapter. A question was put to me, which brought up the subject of physical work under the influence of fermented drinks. It was very generally assumed, then as now, that hard physical work was accomplished most easily under the influence, or it might be said under the aid, of fermented beverages. Pressed for information on this matter, I explained that I would

prefer to confine myself to repeating what I had learned from other witnesses rather than state my own impressions. From this learning I inferred that inclinations have usually governed the doctrines relating to the use of fermented liquors, and it appeared, therefore, to be generally considered that strong drink is necessary for strong men and for strong work. Some evidence, however, which was taken in the course of a collateral investigation, was at variance with this doctrine. Whilst examining some very strong labourers I questioned them as to their diet and mode of living, for comparison with the diet and condition of paupers. One labourer of superior prowess reported that he found that the beer his wife brewed for him, which was ten or twelve gallons from a bushel of malt, was as good beer as he could desire for the hardest work, for thrashing, or for piece-work, and he thought as good as any working man could wish for. Strong beer over-excited men, and as the excitement was for a short period, a repetition of the stimulus was requisite. This opinion, which at first caused surprise, was, nevertheless, corroborated by other labourers. One set of labourers reported that they had been offered porter in the morning, but declined it, and assigned as a reason—a reason, by the way, as forcible as it was scientifically true—that “*it made them work their hearts out.*” The stage coach drivers of that day furnished also a further example. The circumstances of the stage coachmen, their midnight travelling, and their exposure

to all weathers, were popularly considered as calling for the use of strong fermented drinks to "keep out the cold," "the wet," "the fog," and to keep "the wind off their stomachs." The constant dram-drinking of some of the class, who were presumed to know what was best for them, would justify that opinion. But many of the coaches were conducted by men greatly advanced in intelligence and respectability, and they found it conducive to their general health and power of enduring the work and the weather, to pursue a more abstinent course, to take tea, coffee, or milk, and to avoid the general or frequent use of stimulants when on duty.

CHAPTER III.

INTEMPERANCE AND BAD HEALTH.

NO education as yet commonly given appears to have availed against the demoralising effects of intemperance. But the cases of moral improvement of a population by cleansing, draining, and improvement of the internal and external conditions of dwellings, of which instances will be presented, are very numerous and decided, though there still occur instances of persons in whom the love of ardent spirits has gained such entire possession as to have withstood all such means of retrieving them.

The most experienced public officers acquainted with the condition of the inferior population of towns agree in giving the first place in efficiency and importance to the removal of what may be termed the physical barriers to improvement, and against such barriers moral agencies have but a remote chance of success.

A gentleman who had considerable experience in the management of large numbers of the manufacturing population stated to me, that in every case of personal and moral improvement the first successful step was made by the removal of the person from the ill-conditioned neighbourhood in which he had been

brought up. When a young workman married, he interfered to get him a better residence apart from the rest; and when this was done, important alterations followed; but if the man took up his abode in the old neighbourhood, the condition of his wife was soon brought down to the common level, and the marriage became a source of wretchedness.

Benevolent persons, viewing the bare aspect of some of the most afflicted neighbourhoods, have raised subscriptions for the purchase of furniture, bedding, and blankets, for the relief of the inmates, but by this pecuniary aid they have only added fuel to the flame; that is, they have enabled the inmates to purchase more ardent spirits. The force of the habit, which is aggravated by misdirected charity, is indicated in the following instance, mentioned by the Rev. Whitwell Elwin:—

“I was lately informed by a master tailor of Bath, that one of his men, who had earned three pounds a week at piece-work for years, had never within his knowledge possessed table, chairs, or bedding. I found the statement on examination to be strictly true. Some straw on which he slept, a square block of wood, a low three-legged stool, and an old tea caddy, were the complete inventory of the articles of a room, the occupier of which, with only himself and his wife to maintain, was wealthier than many in the station of gentlemen. He had frequently excited lively compassion in benevolent individuals, who, supposing that he was struggling for very existence, furnished him with

a variety of household goods, which were regularly pawned before a week was out, and afforded to the superficial observer fresh evidence of the extremity of his distress. The cause of all this is quickly told ; the wife was to be seen going to and fro several times a day with a cream jug of gin, and to gratify this appetite they had voluntarily reduced themselves to the condition of savages.

“Those,” adds Mr. Elwin, “who think that labourers will work for themselves a reform in their habitations very much underrate the effects of habit. A person accustomed to fresh air, and all the comforts of civilised life, goes into a miserable room, dirty, bare, and, above all, sickening from the smell. Judging from his own sensations, he conceives that nothing but the most abject poverty could have produced such a state of things, and he can imagine nothing necessary to a cure but a way for escape. A very simple experiment will correct these erroneous impressions. Let him remain a short time in the room, and the perception of closeness will so entirely vanish that he will almost fancy that the atmosphere has been purified since his entrance. There are few who are not familiar with this fact ; and if such are the effects of an hour in blunting our refined sensations, and rendering them insensible to noxious exhalations, what must be the influence of years on the coarser perceptions of the working man ?

“All who know the lower classes will testify that the last want felt by the dirty is cleanliness, that their last expenditure is upon the comforts of their home.

Two winters ago, a painter, whose bed was without blankets, whose room was without furniture, who was destitute even of the ordinary utensils of civilised life, whose floor was covered with worse filth than that of the streets, was found at dinner, with a roast loin of pork, stuffed with onions, a Yorkshire pudding, a large jug of ale, cheese, and a salad. I will undertake to say that half the gentlemen in Bath did not sit down on that Sunday to so good a dinner."

A number of communications simply assigned "intemperance" as the cause of fever, and of the prevalent mortality. Of most of these communications, which it were unnecessary to recite, it may be observed that when intemperance is mentioned as the cause of disease, as being the immediate antecedent, on carrying investigation a little further back, discomfort is found to be the immediate antecedent to the intemperance; and where the external causes of positive discomfort do not prevail in the towns, the workpeople are generally found to have few or no rival pleasures to wean them from habits of intemperance, and to have come from districts subject to the discomforts likely to engender them. In one of the returns from Scotland it is observed that with the people, whether for a fever, a cold, or consumption, or a pleurisy, whisky is the universal antidote. The popular belief that fermented liquors or ardent spirits are proper antidotes to the effects of damp or cold has been universal, and has not wanted even medical sanction. Outdoor allowances of beer have been prescribed by some medical officers,

in marshy and undrained districts, as the proper preservatives against ague or rheumatism.

We are now in a position to urge the importance of facilitating drainage as a means for the protection of the population by the prevention of disease and the inducement to pernicious habits, as well as a source of profitable industry. But it is also to be observed that in several dangerous occupations temperance is the best means of withstanding the effects of the noxious agencies which the workers have to encounter. Amongst the painters, for example, the men who are temperate and cleanly suffer little from the occupation, but if any one of them becomes intemperate, the noxious causes take effect with a certainty and rapidity proportioned to the relaxed domestic habits. The inquiry presents many instances of the beneficial effects of the changes of the popular habit of having recourse to fermented liquors or to spirits as necessary protective stimulants. In several of the mining districts, for example, it is an extensive practice to provide for the accommodation of the miners out of the hot mines a room in which they may drink beer as a preservative against the effects of the change to the cold and damp air to which they are about to expose themselves. Dr. Barham, in his report to the commissioners appointed to inquire into the employment of young persons in mines and manufactories, notices an admirable example within the province of voluntary exertion, and the beneficial effects produced by it, in the Dolcoath copper and tin mine, Camborne, Cornwall. There the

proprietors, besides establishing other easy and preventive arrangements, provide a warm room for the miners to change their dresses and take hot meat-soup, which is cheaper probably than beer. "And these men" said "they never felt cold when they took it, and that there had been fewer cases of consumption on the club since this practice had been adopted."

Modern statistics have gone far to show that between intemperance and bad health, ending in a mortality of its own, there is so close a connection, that we may now include intemperance as one of the common causes of mortality. It has been computed that the rate of death from intemperance in England and Wales amounts to one-tenth of the whole. It has also been shown, conclusively, that what may be called the proximity of alcohol leads to an excessive death rate amongst certain members of the community. Thus, in the publican class, the death rate is amongst the highest of all, being as one hundred and forty to one hundred of persons following seventy other well-defined occupations, and as two to one of the clergy of the Church of England. That this is due to the alcoholic habit is proved by the character of the diseases which give rise to the mortality, and the lesson it supplies is one that it is not easy to over-estimate, since the mortality named is only a part of the evil that has to be added to days of sickness and pain, to the excess of expenditure incident to disease, and to that poverty which, in health as well as in sickness, follows the drinking habit as the shadow follows the substance.

CHAPTER IV.

LENGTH OF LIFE IN DIFFERENT CLASSES.

VERY dangerous errors arise from statistical returns and insurance tables of the mean chances of life made up from gross returns of the mortality prevalent amongst large classes, who differ widely in their circumstances. Thus we may find in the sanitary condition of the population of different districts, that the average chances of life of the people of one class in one street will be fifty years, and of another class in a street immediately adjacent, sixty years. In one district of the same town, on the examination of the registers, I found only one out of every fifty-seven of the population died annually; while in another district one out of every twenty-eight died. A return of the average or the mean of the chances of life, or the proportions of death in either instance, would and does lead to very dangerous errors, to serious misapprehensions as to the condition of the inferior districts, and to false inferences as to the proper rates of insurance.

With the view of arriving at some estimate of the comparative extent of the operation of the chief causes of sickness and mortality proved to be prevalent, amidst

the different classes of society, in the towns where the sanitary inquiries have been made, returns were obtained from the clerks of the several unions acting as superintendent registrars. These returns were, as far as practicable, corrected by particular local inquiry, and submitted as the best approximations that could readily be obtained. In all districts, and especially in the manufacturing districts, there was some migration of labourers which would, for the obtainment of perfect accuracy as to the chances of life in particular localities, have rendered necessary an examination of every individual case enumerated. This extent of labour was considered unnecessary. In the returns from single towns, the numbers of deaths of persons of the first class were too small not to be affected by accidental disturbances, but when large numbers of the like class were taken, the uniform operation of the like circumstances was shown in the like results. It is a general defect of the important head of information, "the occupation of the deceased," that the deaths of masters are not carefully distinguished from the deaths of journey-men. So far as this error prevails, it tends to raise the apparent chances of life amongst the labouring classes.

In some instances the occupations of deceased persons or of the parents of the deceased, in the case of children, are not described in the registers. With these, and possibly with other defects that may have escaped notice, these returns will be received as corroborative of the reports of the medical officers and physicians who have attended and observed many of the individual cases

themselves, though not enumerated by them. Had the mortality prevalent amongst workpeople of particular trades and their families been taken, instead of the mean chances of persons of all occupations deriving subsistence from weekly wages, the case of classes with still lower chances would have been presented; but these would have appeared to suggest particular remedies. Such returns of the effects of common evils were, therefore, taken as appeared applicable to the consideration of common or general means of prevention of disease and mortality.

In Truro the number of deaths of professional persons or gentry, and their families, was thirty-three, and the average age of the deceased forty years. Of persons engaged in trade, or similarly circumstanced, and their families, the deaths were one hundred and thirty-eight, and the average age of the deceased thirty-three. Of labourers, artisans, and others similarly circumstanced, and their families, the deaths were four hundred and forty-seven, and the average age of the deceased twenty-eight.

In Derby the proportions appeared to be:—Of professional persons or gentry the deaths were ten, and the average age of deceased forty-nine years; of tradesmen the deaths were one hundred and twenty-five, and the average age of the deceased thirty-eight years; of labourers and artisans the deaths were seven hundred and fifty-two, and the average age of the deceased twenty-one years.

To compare the chances of life between a crowded

manufacturing population and a less crowded rural population, the county of Rutland was taken for observation because it had been selected as an average agricultural district for a comparison as to its general condition by the members of the Statistical Society of Manchester, on an examination from house to house.

The rents of the houses in Rutlandshire were very low compared with those in large manufacturing towns. Not only was the average cost of the former less than half of the latter, but for that diminished cost the dimensions of the houses were double those in large towns, with comforts and conveniences which the latter never can possess.

But moral causes, inducing habits of sobriety, seemed, from the report of the Manchester society, to contribute to the general result of the superior condition of the Rutland population, in which the duration of life amongst the lowest classes was nearly as high as amongst the highest classes in Manchester. But wages in Lancashire, at the time when this inquiry was made, in 1837, were at least double what they were in Rutlandshire.

In comparison with Manchester it was shown that while in Manchester the average age of death, among professional persons and gentry, and their families, was thirty-eight years, in Rutland it was fifty-two years; whilst among tradesmen and their families the average age of death in Manchester was twenty, and in Rutland forty-one years, farmers and graziers being included with shopkeepers. Among mechanics,

labourers, and their families the average age of death in Manchester was seventeen, and in Rutlandshire thirty-eight.

In Leeds Borough the number of deaths among gentlemen and persons engaged in professions, and their families, was seventy-nine, and the average age of deceased persons forty-five years. Of tradesmen, farmers, and their families, the number of deaths was eight hundred and twenty-four, and the average age of the deceased was twenty-seven. Of operatives, labourers, and their families the number of deaths was three thousand three hundred and ninety-five, and the average age of deceased persons nineteen.

But in Liverpool, which is a commercial and not a manufacturing town, where, however, the conditions of the dwellings were reported to be the worst, where, according to the report of Dr. Duncan, forty thousand of the population lived in cellars, where one in twenty-five of the population were annually attacked with fever, there the mean chances of life appeared from the returns to the Registrar-General to be still lower than in Manchester, Leeds, or amongst the silk weavers in Bethnal Green. During the year 1840, the deaths, distinguishable in classes, were as follows:—

In Liverpool the number of deaths among gentry and professional persons was one hundred and thirty-seven, and the average age of deceased thirty-five years. Of tradesmen and their families the number of deaths was one thousand seven hundred and thirty-eight, and the average age of deceased persons twenty-two years.

Of labourers, mechanics, and servants, the number of deaths was five thousand five hundred and ninety-seven, and the average age of the deceased was fifteen years.

Of the deaths which occurred amongst the labouring classes, it appeared that no less than 62 per cent. of the total number were deaths under five years of age. Even amongst those entered as shopkeepers and tradesmen, no less than 50 per cent. died before they attained that period. The proportion of mortality for Birmingham, where there were many insalubrious manufactories, but where the drainage of the town and the general condition was comparatively good, was in 1838 one in forty; whilst in Liverpool it was one in thirty-one.

ORIGIN OF SANITARY MAPS.

In this research the now well-known sanitary map made its first appearance. It was supplied originally with the view of showing the proportions in which the mortality from epidemic diseases and diseases affected by localities fell on different classes of tenements during the same year. The localities in which the marks of death were most crowded were the poorest and the worst of the district; where the marks were few and widely spread, the houses and streets, and all the conditions of the population, were better. By the inspection of a map of Leeds, which Mr. Baker prepared at my request to show the localities of epidemic diseases, it was perceived that these diseases fell similarly on the uncleansed and close streets and wards occupied by the labouring classes, and that the course

of the cholera was nearly identical with the course of fever. It was also observed that in the badly cleansed and badly drained wards to the right of the map, the proportional mortality was nearly double that which prevailed in the better conditioned districts to the left.

The remarkable result obtained from the examination of the death registers of the county of Rutland was an inducement to have them examined for different periods. They were accordingly examined for three complete years, 1838, 1839, and 1840, and it was found that the same general law of mortality obtained with little variation for each period.

As the climate or soil of that county might possess some peculiarities, an examination was made of the average periods of death amongst the agricultural population of all the unions in the county of Wilts during 1840. In this examination the registers of deaths in the towns were excluded, and only those of persons included who were described as agricultural labourers or as farmers and graziers, or as gentry and professional persons resident in the rural districts. The results of this examination were as follows :—

In unions in the county of Wilts the number of deaths of gentlemen and persons engaged in professions and their families was one hundred and nineteen, and the average age of deceased persons fifty years. Of farmers and their families the number of deaths was two hundred and eighteen, and the average age of the deceased forty-eight. Of agricultural labourers and their families the number of deaths

was two thousand and sixty-one, and the average age of deceased thirty-three.

The further results of such returns of mortality as had been made for periods of five and ten years, from an examination of upwards of twenty-five thousand cases, were shown. They exhibited in the mean ratios for large numbers of the like class the steady influence of the different circumstances under which each class was placed. The labouring classes became old the soonest, and the effect of the unfavourable influences in the adolescent and adult stages was shown in the smaller proportions who attained extreme old age, and also in the periods of the deaths of heads of families of this class, by which widowhood was produced.

One of the most important facts elicited in my researches had reference to locality and numbers of deaths in females. The female is most in the house, she is most regular and temperate in her habits, and is not, like the male, subject to the influence of his place of occupation, the workshop, the counting-house, and the crowded places of business. In the following returns made up by Dr. W. Farr, the mortality prevalent amongst the females was therefore given separately, as probably indicating most correctly the operation of the noxious influences connected with the place of residence.

The mean annual mortality of females in metropolitan districts in the two years and a half ending 31st of December, 1839, varied: one death in 57·05 in St. George, Hanover Square; one death in 28·15

in Whitechapel. Yet it is to be observed that the best and the worst districts presented striking instances of extremes of condition in the residences and the inhabitants. In the Bethnal Green and the Whitechapel Unions, in which were found some of the worst conditioned masses of population in the Metropolis, were also found good mansions, well-drained and protected, inhabited by persons in the most favourable circumstances. Immediately behind rows of the best constructed houses in the fashionable districts of London were some of the worst dwellings, into which the working classes are crowded; and these dwellings, by the noxious influences described, were the foci of disease.

These returns were all from large parishes, containing the mean results from all classes. If it had been practicable to give correctly the average rate of mortality prevalent in different classes of streets, the variation of results from the variation of circumstances would, it is to be presumed, have been much greater. Since the character of the residences of many of the labouring classes, and the condition of their places of work and their habits are known, it is to be considered that where the occupations are duly registered, returns, on the principle of those we have just given of the average age at death amongst particular classes, will afford the most close approximation to accuracy, or the best indications of the extent of the operation of the noxious circumstances under which each of these classes is placed.

An impression is often prevalent that a heavy mortality is an unavoidable condition of all large towns, and of a town population in general. It has, however, been shown that groups of cottages on a high hill, exposed to the most salubrious breezes, when cleanliness is neglected, are often the nests of fever and disease, as intense as the most crowded districts. The death returns of particular districts (in the essentials of drainage, cleanliness, and ventilation), to which it is practicable to make other districts approximate, and that too with reduction of existing charges, prove that a high degree of mortality does not invariably belong to the population of all towns, and probably not necessarily to any, even where the population is engaged in manufactures. The proportion of deaths appears in some of the suburbs of the Metropolis (as at Hackney), and of Manchester and Leeds, to be lower than amongst the highest classes in two of the agricultural counties.

In comparison with the very high state of the chances of life in the county of Wilts, the city of Bath presented an example confirmatory of this view. The Rev. Whitwell Elwin supplied the following return of the chances of life amongst the different classes in that city, which was generally considered remarkable for its salubrity.

Of gentlemen, professional persons, and their families, the number of deaths was one hundred and forty-six, and the average age of the deceased fifty-five. Of tradesmen and their families the number of deaths was

two hundred and forty-four, and the average age of the deceased thirty-seven. Of mechanics, labourers, and their families, the number of deaths was eight hundred and ninety-six, and the average age of the deceased twenty-five.

The very high average chances of life amongst the middle classes, which was nearly the same as that of the farmers, and of the agricultural districts, was the fact adduced as most strongly proving the salubrity of the place.

“In making these returns,” said Mr. Elwin, “I have thrown out all visitors and occasional residents, and my knowledge of the locality, with the assistance of the clerk of the union, has enabled me to attain complete accuracy with respect to the gentry, and a close approximation to it in the remaining cases. The difference in the ages of these several classes presents to my mind a tolerably exact scale of the difference of their abodes. The large houses, the broad streets, looking almost invariably on one side or other upon parks or gardens or open country, the spacious squares, the crescents built upon the brows of the hills without a single obstruction to the pure air of heaven, give the gentry of Bath that superiority over other grades and other cities which their longevity indicates. And herein, it appears to me, consists the value of the return. It shows that the congregation of men is not of necessity unhealthy; nay, that towns, possessing as they do superior medical skill and readier access to advice, may, under favourable

circumstances, have an advantage over the country. The situation of the tradesmen of Bath, inferior as it is to that of the gentry, is better than that of their own station in other places. The streets they chiefly inhabit, though with many exceptions, are wide, and swept by free currents of air, with houses large and well ventilated. The condition of the poor is worse than would be anticipated from the better portions of the town. The poor are chiefly located in low districts at the bottom of the valley, and narrow alleys and confined courts are very numerous. Yet even here Bath has an unquestionable advantage over most large towns.

“Whatever influence occupation and other circumstances may have upon mortality, no one can inspect the registers without being struck by the deteriorated value of life in inferior localities, even where the inhabitants were the same in condition with those who lived longer in better situations. The average age of death among the gentlemen was as high as sixty, till I came, at the conclusion, to a small but damp district, in which numerous cases of fever brought down the average to fifty-four. So again with the shopkeepers, the average was reduced two by the returns from streets which, though inhabited by respectable men, were narrow in front and shut in at the back. The average among the labourers was greatly diminished by the returns from some notorious courts, and raised again in a still higher proportion by districts, which appertained rather to

the country than to the town. Of three cases of centenarians, one of whom had attained the vast age of one hundred and six, two belonged to this favoured situation. Not that but great ages were to be found in the worst parts as in the best, or that particular streets did not, in a measure, run counter to the rule. Still, wherever I brought into opposition districts of considerable extent, I found the law more or less to obtain. Bath is a favourable town to institute the comparison, from its presenting such marked contrasts in its houses, and the inquiry being little complicated by the presence of noxious trades, which in some towns would necessarily disturb every calculation of the kind. Even here a colony of shoemakers would bring down the average of its healthiest spot to the age of childhood. My attention was called to this circumstance by the clerk incidentally remarking that more shoemakers were married at his office, and were uniformly more dirty and ill-dressed, than any other class of persons. The proneness to marriage or concubinage in proportion to the degradation of the parties is notorious, and I anticipated from the fact an abundant offspring, afterwards to be carried off by premature disease. Accordingly I went with this view through several of the registers; and the result was, that, while the average of death among the families of labourers and artisans in general was twenty-four and twenty-five, that of shoemakers was only fourteen. Had the shoemakers been excluded from the former average, as for the purpose of this

comparison they should have been, the disproportion would be some years greater.

“The deaths from fever and contagious diseases were found to be almost exclusively confined to the worst parts of the town. An epidemic small-pox raged at the end of the year 1837, and carried off upwards of 300 persons; yet, of all this number I do not think there was a single gentleman, and not above two or three tradesmen. The residences of the labouring classes were pretty equally visited, disease showing here and there a predilection for particular spots, and settling with full virulence in Avon Street and its offsets. I went through the registers from the commencement, and observed that, whatever contagious or epidemic diseases prevailed—fever, small-pox, influenza—this was the scene of its principal ravages; and it is the very place of which every person acquainted with Bath would have predicted this result. Everything vile and offensive is congregated there. All the scum of Bath—its low prostitutes, its thieves, its beggars—are piled up in the dens, rather than houses, of which the street consists. Its population is the most disproportioned to the accommodation of any I have ever heard; and, to aggravate the mischief, the refuse is commonly thrown under the staircase, and water is more scarce than in any quarter of the town. It would hardly be an hyperbole to say that there is less water consumed than beer; and altogether it would be more difficult to exaggerate the description of this dreadful spot than to convey

an adequate notion to those who have never seen it. A prominent feature in the midst of this mass of physical and moral evils is the extraordinary number of illegitimate children, the offspring of persons who in all respects live together as man and wife. Without the slightest objection to the legal obligation, the moral degradation is such that marriage is accounted a superfluous ceremony, not worth the payment of necessary fees; and on one occasion, when it was given out that these would be dispensed with, upwards of fifty persons from Avon Street, who had lived together for years, voluntarily came forward to enter into a union. And thus it invariably happens in crowded haunts of sin and filth, where principle is obliterated, and where public opinion, which so often operates in the place of principle, is never heard, and where, to say truth, virtue is treated with the scorn which, in better society, is accorded to vice. I have been rendered familiar with these places by holding a curacy in the midst of them for upwards of a year, and my duty as chaplain to the Union, in visiting the friends of paupers or discharged paupers themselves, keeps up the knowledge I then contracted."

I think these facts supply us with important conclusions. Whether we compare one part of Bath with another, or Bath with other towns, we find health rising in proportion to the improvement of the residences; we find morality, in at least a great measure, following the same law, and both these inestimable blessings within the reach of the legislature to secure.

When viewed in this light, these investigations, so often distressing and disgusting, acquire dignity and importance.

If we could ascertain the rates of mortality formerly prevalent in the separate districts of each large town, it is probable we should find that the improvement in the average chances of life of the whole town has been raised, principally by the improved chances of life in the districts where the streets have been widened, paved, and cleansed, and the houses enlarged and drained; and that the amount of sickness and chances of life in the inferior districts are as little altered as their general physical condition. The present condition of those parts of London where the average mortality is one in twenty-eight annually, appears to be not dissimilar to the general condition of the whole Metropolis about a century ago, when it was said to be about one in twenty, a rate still to be found in some of the most neglected streets.

An impression of an undefined optimism is frequently entertained by persons who are aware of the wretched condition of a large portion of the labouring population; and, this impression is more frequently entertained than expressed, as the ground of inaction for the relief of the prevalent misery from disease,—viz., that its ravages form the natural or positive check, or, as Dr. Short terms it, “the terrible corrective,” to the pressure of population on the means of subsistence.

In the most crowded districts which have been the

subject of inquiry, the facts do not justify this impression; they show that the theory is inapplicable to the present circumstances of the population. How erroneous the inferences are in their unrestrained generality, which assume that the poverty, or the privation which is sometimes the consequence, is always the cause of the disease, will have been seen from such evidence as that adduced from Glasgow and Spitalfields, proving that the greater proportion of those attacked by disease are in full work at the time; and from the evidence of the fever hospitals, that the greatest proportion of the patients are received in high bodily condition.

If wages be taken as the test of the means of subsistence, how are such facts to be reconciled as these, that at a time when wages in Manchester were ten shillings per head weekly on all employed in the manufactories, including children or young persons in the average, so that if three or four members of a family were employed, the wages of the family would be thirty or forty shillings weekly, the average chances of life to all of the labouring classes were only seventeen years; whilst in the whole of Rutlandshire, where the wages were certainly not one-half that amount, the mean chances of life to every individual of the lowest class were actually thirty-seven years? Or, to take another instance, that whilst in Leeds, where, according to Mr. Baker's report, the wages of the families of the worst-conditioned workers were upwards of twenty-one shillings per week, and the chances of life amongst the

whole labouring population of the borough were only nineteen years; in the county of Wilts, where the labourer's family would not receive much more than half that amount of wages in money, and perhaps not two-thirds of money's worth in money and produce together, we find the average chances of life to the labouring class thirty-two years.

If, in the most crowded districts, the inference is found to be erroneous, that the extent of sickness and mortality is indicative of the pressure of population on the means of subsistence, so is the inference that the ravages act to the extent supposed as a positive check to the increase of the numbers of the population. In such districts the fact is observable, that where the mortality is the highest, the number of births are more than sufficient to replace the deaths, however numerous they may be.

The proportion of mortality in the several townships denotes, with little variation, the state of the streets and houses and the condition of the inhabitants. Thus the township of Broughton is inhabited almost exclusively by the upper classes, who are connected with Manchester. The houses are new, spacious, and well built; the site is elevated, and offers great facilities for drainage. The township of Cheetham and Crumpsall is also inhabited for the most part by the upper classes, who live in peculiarly good houses, with a superior natural drainage. There is a proportion of the working population resident in this district, whose houses are well built and also favourably situated for

drainage. The condition of the inhabitants of a large proportion of the labouring population in Manchester has already been described.

It will be observed also that the moral as well as the sanitary influences have a coincidence in the larger proportion of the illegitimate births in the worst-conditioned districts. In the best-conditioned districts the great majority of illegitimate births belong almost exclusively to the more dissipated of the labouring classes who inhabit them.

In the ten registration districts of Leeds the mortality prevalent in them varied coincidently with their physical condition, and the recklessness and immorality, as shown in the proportion of illegitimate births, increased in a greater proportion than the mortality ; and in this instance also, as in most others, if the registrations were more accurate, the proportion of both legitimate and illegitimate births would be still closer to the deaths in the worst-conditioned districts.

In the lowest districts of Manchester, of 1,000 children born more than 570 had died before they attained the fifth year of their age. In the lowest districts of Leeds the infant mortality was similar. This proportion of mortality M. Mallet would designate as the case of a population but little advanced in civilisation, ravaged by epidemics,—a population in which the “ influences on the lower ages are murderous, but where the great mortality in infancy is compensated by a high degree of fecundity. It is the case of the population in many large towns, especially in past

ages." But whilst in Manchester, where one-twenty-eighth of the whole population was annually swept away, the births registered amounted to twenty-six of the population ; in the county of Rutland, the proportion of births, as shown by an average of three years—and by a registration which I apprehend was more complete than in the lower districts of Manchester—was only one to three of the population.

Since the facts named above were collected, sanitary measures have modified some details. But, relatively, the facts are much as they were, and the picture, with a new tone of colour, is nearly the same. It is still clear that the value of life in different classes of the community continues subject to influences of a domestic nature, using that word in its strictest meaning, which neither medical nor sanitary science has as yet duly appreciated, and which the educated mistress of the house can alone master and keep under control.

CHAPTER V.

VITAL FEEBLENESS IN CROWDED POPULATIONS.

INCREASE of births in a proportion to the high rate of mortality in unhealthy districts has frequently been noted on the Continent. M. Quetelet observed this fact in several countries, and gives instances from which the following are selected :—

Department of Arne, 52·4 for one death ; 147·5 for one marriage ; 44·8 for one birth. Department of Finisterre, 30·4 for one death ; 113·9 for one marriage ; 26·0 for one birth. Province of Namur, 51·8 for one death ; 141·0 for one marriage ; 30·1 for one birth. Province of Zealand, 28·5 for one death ; 113·2 for one marriage ; 21·9 for one birth.

M. Quetelet's facts showed that, as far as the present state of information can be relied upon, the same law is observed in general action, not only in provinces, but in whole countries throughout Europe. It is confirmed by extensive experience occurring in the New World. The trustworthiness of the registration of births and deaths in Mexico is attested by the examination and use of them by Humboldt, and has been the subject of legislative proceedings. The ratios

of births and deaths in the province of Guanaxuata have been referred to by Sir F. d'Ivernois, in illustration of the proposition that pestilence does not check the progress of population. A large proportion of the inferior Mexican population are reported to "have converted the gifts of Heaven to the sustenance of disgusting misery." It is reported of this populace that it is "half-clothed, idle, stained all over with vices;" in a word, hideous, and known under the name of *leperos* (lepers), on account of the malady to which their filth and bad diet subject them. Nothing can exceed the state of brutality and superstition to which they have been subjected.

The fecundity of this population, sunk in the lowest vice and misery amidst the means of the highest abundance, was greater than amidst any other whole population in Christendom. They stood in 1825 and 1826 as :—deaths, 1 in 19·70 ; births, 1 in 16·08. They are much mistaken who imagine that a similarly conditioned population is not to be found in this country ; it is found in parts of the population of every large town ; the description of the Mexican populace will recall features characteristic of the wretched population in the worst parts of Glasgow, Edinburgh, London, and Bath, and the lodging-houses throughout the country.

Seeing that the banana—with the plantain, or maize—is the chief food of the inferior Mexican populace, their degraded condition has been ascribed to the fertility of that plant, as the degradation of a

large proportion of our population has been ascribed to the use of the potato, whereas a closer examination would have shown the fact of large classes living industriously and virtuously on simple food, and preferring saving money to better living; and if a high and various meat diet were the cause of health, industry, and morality, those virtues should stand highest amongst the population of the lodging-houses, for more meat and varied food is consumed in those abodes of pestilence than amongst the industrious population of the village. In Manchester, where we have seen that the chances of life are only seventeen years, the proportions and varieties of meat consumed by the labouring classes are as their greater amount of wages compared with the meat consumed by the labouring classes in Rutlandshire, whose mean chances of life are thirty-eight years. But I apprehend that the superior health in Rutlandshire is as little ascribable to their simpler food as the greater amount of disease amidst the town population is ascribable to the greater proportion of meat which is there consumed. It is probable, indeed, that the standard of vitality in Rutlandshire might have been raised still higher by improvements in the quality of their food. There are abundant reasons to render it desirable that the food of the population should be varied, but it is shown that banishing the potato, or discouraging its use, or introducing any other food, will not banish disease.

By means of the census of 1841, and the year's completed registration of deaths and births in England

in 1811, it was found that there had been an increase of the population from births alone in those parts of the country where the proportionate mortality had been the greatest.

The estimated increase of population in England in the year 1840, as compared with 1839, was 190,460. In the same period the births exceeded the deaths by 143,178. The difference between these two amounts, or 47,282, may be considered as the extent of immigration to England, together with the cases of births not registered. To whatever extent emigration takes place from England, there must, of course, have been a proportionate immigration from other places to make up the increase of population beyond the apparent increase from births.

It is observed in some of the worst conditioned of the town districts that the positive number of the natives of the aboriginal stock continually diminishes, and that the vacancy, as well as the increase, is made up by immigration from the healthier districts. In a late enumeration of the settled inhabitants of the labouring classes in the lower parts of Westminster it appeared that not more than one-third of them were natives of London. If inquiry had been made as to whether their parents were natives, it would probably have been found that still fewer had inhabited the district for more than one generation.

The important general fact of the proportion of adult physical strength to the increased duration of life or improved sanitary condition of the individuals

is verified by the examinations of the individuals of different classes. M. Villermé has stated that the difference of strength between classes such as those in which we have seen that the value of life differs, is well known to the officers engaged in recruiting the army, but no one has collected the facts to determine the precise difference. The time allowed to M. Villermé only enabled him to do so at Amiens. The result was, that the men of from twenty to twenty-one years of age were found the more frequently unfit for the trade of arms from their stature, constitution, and health, as they belonged to the poorer classes of the manufacturing labourers. In order to obtain 100 men fit for military service, it was necessary to have as many as 343 men of the poorer classes, while 193 conscripts sufficed of the classes in better circumstances. Analogous facts were observed in the greater part of the towns in France in which he conducted his official investigations.

In the evidence of recruiting officers, collected under the Factory Commission of Inquiry, it was shown that fewer recruits of the proper strength and stature for military service are obtainable now than heretofore from Manchester. Of those labourers now employed in the most important manufactories, whether natives or migrants to that town, the sons who are employed at the same work are generally inferior in stature to their parents. Sir James McGrigor, the Director-General of the Army Medical Board, stated the fact,

that "a corps levied from the agricultural districts in Wales, or the northern counties of England, will last longer than one recruited from the manufacturing towns,—from Birmingham, Manchester, or near the Metropolis." Indeed, so great and permanent is the deterioration, that out of 613 men enlisted, almost all of whom came from Birmingham and five other neighbouring towns, only 223 were approved for service.


The chances of life of the labouring classes of Spitalfields are amongst the lowest met with, and there it is observed of weavers, though not originally a large race, that they have become still more diminutive under the noxious influences to which they are subject. Dr. Mitchell, in his report on the condition of the hand-loom weavers, adduces evidence on this point. One witness, well acquainted with the class, states, "They are decayed in their bodies; the whole race of them is rapidly descending to the size of Liliputians. You could not raise a grenadier company amongst them all. The old men have better complexions than the young." Another witness, who says there were once men as well made in the weaver trade as any other, "recollects the Bethnal Green and Spitalfields regiment of volunteers during the war as good-looking bodies of men; but doubts if such could be raised now." Mr. Duce concurs in the fact of the deterioration of their size and appearance within the last thirty years, and attributes it to bad air, bad lodging, bad food; "which cause the children to grow up an enfeebled and diminutive race of men."

This depressing effect of adverse sanitary circumstances on the labouring strength of the population, and on its duration, is to be viewed with the greatest concern, as it is a depressing effect on that which most distinguishes the British people, and which it were a truism to say constitutes the chief strength of the nation—the bodily strength of the individuals of the labouring class. The greater portion of the wealth of the nation is derived from the labour obtained by the application of this strength, and it is only those who have had practically the means of comparing it with that of the population of other countries who are aware how far the labouring population of this country is naturally distinguished above others. There is much practical evidence to show that this is not a mere illusion of national vanity, and in proof of this might be adduced the testimony of some of the most eminent employers of large numbers of labourers, whose conclusions are founded on experience in directing the work of labourers from the chief countries in Europe,—*e.g.*, Mr. William Lindley, the civil engineer, who, engaged in the superintendence of the formation of the new railway between Hamburg and Berlin, found it expedient to import as the foremost labourers for the execution of that work a number of the class of English labourers called navigators or navvies. These were employed in pile-driving, at wages of five shillings per diem, or more than double the amount of wages paid to the German labourers. The German directors were surprised, and remonstrated at the

enormously high wages paid to the English labourers ; when the engineer directed their attention to the quantity of work performed by them within a given time, and showed that the wages produced more than among the native labourers. English labourers of the same class have been imported to take the foremost labour in the execution of the railways in France, from Havre to Paris, their work at very high wages being found cheaper than the work even of Norman labourers. Skill and personal strength are combined in an unusually high degree in this class of workmen, but the most eminent employers of labour agree that it is strength of body, combined with strength of will, that give steadiness and value to the artisan and common English labourer.

CHAPTER VI.

THE COST OF UNHEALTHY EMPLOYMENTS.

 HE more closely the subject of the evils affecting the sanitary condition of the labouring population is investigated, the more widely do their effects appear to be ramified. The pecuniary cost of noxious agencies is measured by data within the province of the actuary, by the charges attendant on the reduced duration of life, and the reduction of the periods of working ability or production, by sickness. The cost would include also much of the public charge of attendant vice and crime, which come within the province of the police, as well as the destitution which comes within the province of the administrators of relief. Of the pecuniary effects, including the cost of maintenance during the preventable sickness, any estimate approximating to exactness could only be obtained by very great labour, which does not appear to be necessary.

To whatever extent the probable duration of the life of the working man is diminished by noxious agencies, I repeat a truism in stating to some extent so much productive power is lost; and in the case of destitute widowhood and orphanage, burdens are created and

cast either on the industrious survivors belonging to the family, or on the contributors to the poor's rates during the whole of the period of the failure of such ability. With the view to judge of the extent to which such burdens are at present cast upon the poor's rates, I once endeavoured to ascertain the average age at which death befell the heads of those families of children who with the mothers had been relieved on the ground of destitution, in eight of the unions where the average age of the mortality prevalent amongst the several classes of the community had been ascertained.

The workmen who belong to sick-clubs and benefit societies generally fix the period of their own superannuation allowances at from 60 to 65 years of age. I see no reason to doubt that by the removal of injurious agencies not essential to their trades, by sanitary measures affecting their dwellings, combined with improvements in their own habits, the period of ability for productive labour might be extended to the whole of the labouring class.

The actual duration of the ability for labour will vary with the nature of the work, though there can be little doubt that the variations under proper precautions would be much less than those which now take place. From the information received in respect to the employment of tailors in large numbers, it is evident that the average period of the working ability of that class might be extended at least ten years by improvements as to the places of work alone.

The experience which might serve to indicate the extent of practicable improvement is at present narrow and scattered. The chief English insurance tables, such as the Northampton and Carlisle tables, are made up apparently from the experience of a population subject probably to a greater or less extent to the noxious influences which are shown to be removable. By the Carlisle table, however, the probability of life to every person who has attained the age of twenty-one—the age for marriage—would be 40 years, or 40·75. By the Swedish tables, which are frequently applied to the insurance of the labouring classes, it would be 38·0. The observations that have been made on the subject show that marriage improves rather than diminishes the probability of life. Where the duration of life is reduced by the nature of the employment below the average, by so much the widowhood may be considered as increased, as also the orphanage of the children. As labouring men generally marry early in life, their wives have ceased to bear children before they have reached fifty, so that the great mass of orphanage may be assigned to the consequence of premature death.

Premature widowhood and orphanage is the source of the most painful descriptions of pauperism, the most difficult to deal with, and a source of a constant influx of the independent into the pauperised and permanently dependent classes. The widow, where there are children, generally remains a permanent charge; re-marriages amongst those who have children

are very rare ; in some districts they do not exceed one case in twenty or thirty. By the time the children are fit for labour and cease to require the parents' attention, the mothers frequently become unfit for earning their own livelihood, or are habituated to dependence, and without care to emerge from it. Even where the children are, by good training and education, fitted for productive industry, when they marry, the early familiarity with the parochial relief makes them improvident, and they fall back upon the poor's rates on the lying-in of their wives, on their sickness, and for aid on every emergency. In every district the poor's rolls form the pedigrees of generations of families thus pauperised. The total number of orphan children on account of whose destitution relief was given from the poor's rates in the year ended Lady Day, 1840, in one set of unions, was 112,000. The numbers of widows chargeable to the poor's rates was, in those unions, at that period, 43,000.

Instances have frequently been presented in the course of my inquiries of the moral degradation of the children of workpeople, and of the workpeople themselves, who have once been in moral condition ; but the cases taken from the pauper roll of the union will serve to show that even a good education will not, of itself, sustain such a body of workmen against the physical causes of depression. The group of cases of widowhood, when considered, will serve to show that the causes in question create the evils of which they are supposed to be natural correctives.

With an educated class of workmen, the obtainment of a place and the wages of an adult must be the necessary preliminary to a marriage, and unless such place or wages are obtained, the young workman will either remain single or seek employment further afield. But we will suppose, for illustration, that a casualty occurs, such as the last death on the list, J. M., where a young miner who has married, and has a wife and two children, is prematurely swept away by an epidemic at 21 years of age, leaving a widow and two destitute orphan children dependent on poor relations, or on the ratepayers. The first mentioned, say S. H., then takes the vacant place of work, marries, and is killed at 34 years of age by "an accident in the mine," leaving a widow and seven orphan children. The third vacancy in the place of work is occupied by another miner, H. Y., who marries and works until he is 45, when he is killed by "consumption," leaving a widow and five children. Such casualties do not of course actually so fall on any one place of work, but the vacancies so created in different places at the younger periods of life must be and are supplied by new hands coming into the employment, and marrying as a consequence of that employment, and the succession will fairly represent the mode in which the vacancies created by the various causes of death displayed in the last table and in the other tables of the causes of premature widowhood and orphanage occur.

In works where the average period of working ability is extended to the natural period of superannuation,

namely, an average of full sixty years, which a combination of internal and external sanitary measures may be expected to give, the account for one place would be one superannuated workman and one widow, and a family of four or five well-grown children, who, having received parental care during that period, would probably all have obtained, before its termination, the means of independent self-support. Whereas with a population of only fifteen or twenty years of working ability, the same place of work may during the same period have been filled by two generations and one-fourth of workpeople, not one of which has brought all the children dependent on it to maturity or a condition for self-support; while the place of work shows three widows instead of one, and three sets of stunted and unhealthy children dependent for such various periods, as those above specified, and competing for employment at the same place, instead of one set of healthy children arrived at the age of working ability for self-support. The occupation of the places of work by a comparatively young and procreative population, brought forward by the premature removal of the middle-aged and the aged workers, by the various causes of premature deaths—the acceleration of births by premature deaths in infancy as stated in a preceding note—will, I apprehend, clearly account for the generally increased proportions of births in those districts where the rate of mortality is high; and it will scarcely be necessary to give further illustrations of the dreadful fallacy which tends to an acquiescence in the continuance of the causes of

pestilence and premature mortality as "correctives of the pressure of population."

Deaths from accidents affect the toilers, but they bear only a small proportion to the deaths from disease. Registries show that the scattered deaths from various descriptions of violence amount to an average of about 12,000 yearly, in England and Wales alone, or more than aroused the national attention in the massacre of the troops of the empire during the last war in India. The position which this class of causes occupy, in the production of destitute orphanage and widowhood, does not comprehend the whole of the effects; another class of which appear on examining the causes of pauperism; namely, the injuries which occasion permanent disablement.

On examining the individual cases of deaths that are classed as incident to the pursuit of the chief branches of mining or manufacturing industry, or in transport whether by land or water, it has always been satisfactory to find that for the future, by care, the greater proportion of them are preventable. In the case of the mining accidents, one part of them appears preventable by care of the superior managers of the mines—in arrangements over which the individual workman has no control; the other portion, by intelligence and care on the part of the workmen; and this last class of cases again reverts back to the power, and therefore to the means of imposing responsibility on the employers in the selection of educated and intelligent workmen of habits of sobriety

and care, to qualify them for works of danger. But at present they are, in a great measure, relieved from responsibility by the charge incurred by the want of care being thrown on other funds raised from persons who have as yet no practicable means of protection or prevention.

CHAPTER VII.

PUBLIC WALKS FOR THE PEOPLE.

WHILST separation rather than aggregation, more especially for families, is the course of policy suggested by experience for the places of residence of the working classes, accommodation is called for from every part of the country for public walks or places of recreation.

Much evidence might be adduced from the experience of the effects of the parks and other places of public resort in the Metropolis to prove the importance of such provision for recreation, not less for the pleasure they afford in themselves, than for their rivalry to pleasures that are expensive, demoralising, and injurious to the health. A benevolent gentleman near Cambridge, who wished to arrest the debauchery and demoralisation promoted by a fair, and, if possible, to put an end to the fair itself, instituted, on the days when it was held, and at a distance from it, a grand ploughing match, at which all persons of respectability were invited to attend. This brought from the fair all the young men whom it was desired to lead from it to a regulated and a rational and beneficial entertainment, and thus, without force and

at a very trivial expense, the fair was suppressed by the quiet mode of drawing away its profit.

On the holiday given at Manchester in celebration of Her Majesty's marriage, extensive arrangements were made for holding a Chartist meeting, and for getting up what was called a demonstration of the working classes, which greatly alarmed the municipal magistrates. Sir Charles Shaw, the Chief Commissioner of Police, induced the Mayor to get the Botanical Gardens, Zoological Gardens, and Museum of that town, and other institutions, thrown open to the working classes at the hour they were urgently invited to attend the Chartist meeting. The mayor undertook to be personally answerable for any damage that occurred from throwing open the gardens and institutions to the classes who had never before entered them. The effect was that not more than two or three hundred people attended the political meeting which entirely failed, and scarcely five shillings' worth of damage was done in the gardens or in the public institutions of the workpeople, who were highly pleased. A further effect produced was, that the charges before the police of drunkenness and riot were on that day less than the average of cases on ordinary days.

I have been informed of other instances of similar effects produced by the spread of temperate pleasures on ordinary occasions, and their rivalry to habits of drunkenness and gross excitement, whether mental or sensual.


But want of open spaces for recreation is not confined to the town population. In the rural districts the children and young persons of the villages have frequently no other places for recreation than the dusty road before their houses or the narrow and dirty lanes, and accidents frequently take place from the playing of children on the public highways. If they go into the fields, they are trespassers, and injure the farmer. The want of proper spaces as playgrounds for children is detrimental to the morals as well as to the health of the towns, and it probably is so generally. The very scanty spaces which the children both of the middle and the lower classes, the ill as well as the respectably educated, can obtain, force all into one company, to the detriment of the better children, for it is the rude and boisterous who obtain predominance.

In the course of some investigations which I had occasion to make into the causes of juvenile delinquency, there appeared several cases of children of honest and industrious parents who had been entrapped by boys of bad character. I inquired how the more respectable children became acquainted with the depraved, when it was shown that, in the present state of many crowded neighbourhoods, all the children of a court or of a street were forced to play, if they had any play whatsoever, on such scraps of ground as they could get, and all were brought into acquaintanceship, and the range of influence of the depraved was extended. The condition of the children in large

districts where there are no squares, no gardens attached to the houses, and no playgrounds even to their day-schools, and where they are of a condition in life to be withheld from playing in the streets, is pronounced to be a condition very injurious to their bodily development. The progress of the evil in the rural districts has been, to some extent, arrested by a beneficent standing order of the House of Commons, that all the Enclosure Bills shall include provision for a reserve of land for the public use for recreation. For children, however, the most important reservations would be those which could be made for playgrounds in front of their homes, on plots where they may be under the eye of their mothers or their neighbours. The separate or distant playgrounds have many inconveniences besides their being out of sight; and where they are far distant, they are comparatively useless. I have great pleasure in being enabled to testify that the instances are frequent where the regulated resort to private pleasure-grounds and parks has been indulgently given for the recreation of the labouring population.

CHAPTER VIII.

HEALTH *versus* WAR.

REAT BRITAIN, in regard to the extent of its population, has the smallest army of any of the Great Powers, and for the demands of that population is the least to be found fault with on the score of militarism. Let us by contrast look abroad at the working of some bad economical conditions which reduce health and life and strength. Let us look at Italy. Two millions of money were voted for the relief of Naples, by sanitation, from the late visitation of the cholera. But there was a deficit in the treasury, and the Government had not the money to give. The deficit was due to the enormous expenses of *militarianism*—to bloated armaments, and to a fleet of big war ships, some of which ships must have cost, as ours have done, a million of money each. This expenditure was money thrown away, because there is at this time an international *morale* that would prevent the employment of it. If France, with its million of force, were to threaten little Belgium or Holland, it would be met by this *morale*, which *morale* will now be aided by the new guns of precision, that will give one to offence,

and more than three to defence, and will add to the moral security of the smaller States as well as to the greater States occupied on the work of sanitation.

A French military writer showed some time ago, in the *Journal des Economistes*, that with the new arms of precision an army of a hundred thousand men, trained to their use, might defend France effectually against invasion, and it may be confidently declared that if at this time Italy had not a regiment of soldiers beyond its requisite police force, or the smallest naval police, that same international *morale* would prevent any one of the great war States from assailing her, or from preventing the peaceful application of her revenue to the works required for the relief of the distressed population, or from lessening her purchasing power of her best allies. As an example of the aggression of militarism to the depression of the life and strength of civil populations in peace, I have seen exhortations to the Government of the United States that they ought to have a fleet of big war-ships corresponding to our big war-ships, and costing a million of money each. The biggest naval Power to attack her with such big ships would be our own. But imagine our Queen permitting a shot from one of them being thrown upon our American brethren!

A WAR-SHIP'S WORTH OF SANITATION.

It may be of use to give an estimate of the civil life and force that may be gained to sanitation by the application of a million of money—the cost of one big

ship—if the sum were spent on sanitation. In the towns where water-works were properly carried out on the separate system by contracts under the Public Health Act, the cost was a penny a week for bringing a constant supply of water to the door, a penny halfpenny per week for the internal distributory apparatus, including the water-closet and the kitchen sink and the self-cleansing house drains, and a penny a week for self-cleansing sewers, or 15s. per annum. Since the time of our works on the separate system, the price of labour in England has been raised by a third. But the cost of the chief materials has been reduced by about one-half, so that the estimates I have cited would stand for England very much as they were. The expenditure of a million at 5 per cent., the cost of the big ship, would at this rate be equal to the sanitation of 66,666 houses, or, at five inhabitants per house (the suburban average with us), it would serve for 333,333 inhabitants. Suppose the expenditure effected a reduction of the death-rate by only 5 per 1,000 (and on the average of the towns under the separate system it is 9 per 1,000), the saving of life would be 1,667 per annum.

To each case of death there are at the least twenty cases of bed-lying sickness of adults, so that there would be a total annual saving of at least 33,330 cases of sickness for the value of each big ship. For one decade the saving would be 16,667 lives, and 333,333 cases of sickness. And be it noted that this accumulation of civil life and force and economy goes on during

all the long intervals of peace, whilst in militarism waste goes on from the deterioration of the appliances of war and the progress of inventions.

MILITARISM *versus* SANITATION.

The money wasted by the Italian Government on two big war-ships would, I estimate, have sufficed to advance the health of the population of Naples in its grand and superior climate up to the normal. The sanitation of Paris is now delayed by the deficit in the municipal funds, and the general Budget of the Republic, and that delay is due to the wasteful expenses of its big and, for defensive purposes, wasteful, armaments. I have had means of estimating the losses of France by militarism in Algeria, where the needless fortifications of internal towns would have sufficed to put each town in good sanitary condition, to have fitted them as seats of emigrants, and to have given strength as well as revenue. The evident waste by militarism in Algeria since its occupation by France would have sufficed to have put all the cities and towns of France in a position that in seven years would replace, with a stronger and better population, all that France has lost by the cession of Alsace and Lorraine, while it would also, by the extensive preservation of infant life, check the relative depression of the progress of the population of France.

Let me extend the illustration. I would submit to the examination of my *confrères* of the Institute to consider that we hold all India with a force of some

seventy thousand men, and about two hundred thousand of native force, or little more than is employed by the French to hold Algeria, on the pretext of its use as a school of military exercise, in which it has proved to be an egregious failure. In 1865, I obtained permission of Lord Ripon, then Minister of War, to have an examination made of what appeared to me to be an important sanitary norma for application to India which the specialists from India who inquired declared it to be. One of the most eminent of the Indian administrators (the late Mr. Robert Ellis, afterwards member of the Indian Council) stated to me, upon his observation there, that we should certainly hold Algeria effectively with a third of the force used there for France.

Full two-thirds of the force in Algeria is a dire waste by militarism at the expense of the most poor and depressed population of France. In some conversation which I had with the late Emperor, I learned that when he visited Algeria he had never heard of the existence of the sanitary norma, which appeared to be so important, and which showed a reduced death-rate of the army from eighty to twelve in a thousand, with a corresponding reduction of the death-rate of the civil population. It had been evidently kept out of sight, as leading to the extended application of resources to a new and special service.

A year's cost of keeping each soldier unproductively in camp or cantonment would serve to drain one hectare or two acres of the marshy or water-logged land

so extensive in France. M. Maurice Block, of the Institut, reckoned the loss of productive labour occasioned there by the conscription at one hundred and thirty-two millions of days, annually estimated at two francs a day.

Let me give another example of the wastefulness of militarism in the State with a large deficit, occasioned by militarism, and with the most heavily death-rated population of all Europe. We English hold all Bengal, which has a population of upwards of sixty-five millions (the equivalent of all the old Russia), with about ten thousand of British force and some twenty thousand of native force. For holding an equivalent population Russia has a million of military force. One of the most able sanitary engineers of our service, in the army sanitary commission of the Crimea, declared to me, as he was well competent to do, that if the money spent by Russian militarism in the fortification of Sebastopol had been applied in opening up the fine territory thereabouts with roads and such sanitary works as would fit it for settlement, an amount of civil population and of force would have been raised there, that would have withstood the combined armies of France and England, which the fortifications failed to do. Russia, judged by its army (where the death-rate and the loss of force is three times greater and heavier than the death-rate of the German army), appears to be the heaviest death-rated State of all Europe. Towns and villages are destitute of any sanitary provision whatsoever, and are immense

cess-pits of putridity, with waste of the manure ; while in their wretched fields, according to Lady Verney, the produce is only from two and a half to four and a half of the seed sown, instead of fifteen to twenty, as in England.

Yet Russia had one sanitary norma from our first Board of Health. At each visitation of Asiatic cholera, St. Petersburg was ravaged with a loss of twenty thousand people killed, until, as a physician of the Czar informed the Sanitary Congress in Holland, they heard of the preventive course taken by our first general Board of Health, and adopted the same, with the result of decreasing the death-rate to one-fourth of what it had previously been. But there has been no recognition or extension of this example. The application of English capital was invited for improvements of the Russian cities, and one of the first waterworks and of sanitary works in Europe was provided by an English company, completed by my son ; but the promised payment has not been forthcoming, and English capitalists are warned against further schemes.

Wheresoever we see a heavily death-rated State we see a State where the sanitary condition of the population is neglected, and we see a troubled and insecure State, and that is the condition of Russia beyond any other State in Europe ; where occupation is provided for its excessive army by continued threatened troubles ; and where repression by the excessive military force generates and maintains expense.

Look, again, at the defenceless condition, from want

of sanitary knowledge, of the poor people of Spain as shown in the last attack of cholera, when more human beings fell than in the great Peninsular War. Yet, untaught by that terrible experience, I read only this week of a Spanish admiral proposing an expenditure of eleven millions of money on new war ships; which, on our reckoning, would save for a decade 183,335 lives and 3,666,667 cases of sickness. The proposed cost of this fleet expended in sanitation would save in one decade more than a thousand lives, and forty thousand cases of sickness of adult labourers, and more than half the ordinary insurance charges against excessive sickness and mortality.

MILITARY GAINS FROM SANITARY SCIENCE.

Germany, it is reported, has by the application of sanitary science reduced the army death-rate to five per one thousand annually; that is to say, to less than one-half of the death-rate prevalent amongst the civil population of the same ages. By this reduction, and by physical training, during a short service, it augments the aptitude and productive power of the men for civil service. It is considered that such economy might be effected without so much long barrack detention. Indeed, we have shown that the largest proportion of military exercises may be beneficially transferred from the productive adult stages to the less productive juvenile stages and almost to the infantile stages of life. However, by the application of sanitary science, Germany has gained during little more than ten years

as much life and force as was lost during the Franco-German war.

Professor Sormani, of Pavia, has shown us by an analysis of the death-rates of the armies of Europe the progress of our science. With us it is, of the home army, eight in a thousand (it was once seventeen). In France it is ten in a thousand; in Austria and Italy it is as much as eleven and a half, but in Russia it is more than sixteen in a thousand.

For ourselves, sanitation has gained for the Indian, as well as the home army, a great extent of the relief we proposed for it. In the Indian army we have obtained a reduction from the old death-rate of sixty-nine to less than twelve in a thousand. During the last decade, when the reduction had been got down to twenty in a thousand, a gain of forty thousand of force, first to last, had been achieved, and a further gain of six millions of money. Our Royal Navy has made advances in sanitation more than double that of the mercantile marine, but it is yet, with a selected class of superior subjects, far behind the sanitation of the prisons, with their lowest class of population in regard to physical condition.


A sanitary official tells me that he was once sitting with a principal medical officer looking at some artillery practice at sea, when the officer exclaimed, "There they go! If I could only get the money they waste for a few days I should be able to place my hospital in the best sanitary condition." We have yet to advance in India and to hold more

firmly our dominion by the sanitary improvement of the civil population. In our colonies, where, in the ignorance of sanitation, settlements have been made on undrained and malarious sites, with undrained houses and towns, there has been a great excess of preventable disease. Sanitary defences against these enemies in our colonies are, it may be shown, of primary importance. They will give more strength of life and force than those military defences, so very gratuitously, as I conceive, imagined to be immediately necessary. Mr. Sala, the well-known writer, would, I expect, confirm this view.

In conclusion, I would say, despite neglects, let us keep our attention on our established sanitary normas and on extending those normas, with confidence that our work will give us a greater future than the world has ever imagined, much less seen. Towards this great future your labours, modest as they are, will contribute their certain and useful quota, if you go on and on, trusting ever in industry, truth, and increasing knowledge.

CHAPTER IX.

BANKRUPTCY AND HEALTH.

OME time ago a cry was raised from London Vestries that every third shopkeeper in Regent-street was a bankrupt, and a bankrupt by reason of the pressure of taxation. I received a request from the Board of Trade to make some enquiry as to the prevalent causes of bankruptcy. I made enquiries from commissioners of bankruptcy and from official assignees, as to the causes of the cases of bankruptcy which came under their examination. What was the proportion of cases of bankruptcy which arose from causes which no ordinary prudence could have averted, meaning by ordinary prudence, *i.e.*, the prudence of the trade or the occupation of the bankrupt? One of the most experienced of the commissioners answered that he had been a commissioner for twenty years, and during all that twenty years, he had only met with one case which ordinary prudence would not have averted. And what was the cause in that one case? Why, in fact, he had been unable to make it out! The official answers were almost all of the same tenor. One common cause amongst tradesmen was speculation in

matters with which they were imperfectly acquainted, in matters that were out of their own business. A bookseller in extensive business had failed for a very large amount. The main cause of the bankruptcy was speculation in hops. Another failure was due to a great venture in a pearl fishery, of which the tradesman knew nothing; others were of rash and unwarranted enterprises in joint stock companies. There was scarcely a failure in the bankrupt's own business, except of this sort. An old business had gone on for years at what was considered a good profit; but under competition the profits were reduced to less than one-half. Nevertheless the bankrupt had gone on for years, keeping up an establishment of double his income. In one instance, a death disclosed the fact that a tradesman, a jeweller, had for some twenty years kept up a large suburban establishment in high style, had been liberal to charities, and maintained an exemplary character, who had all that time been living on borrowed money and knew that he was insolvent. In one instance a man had for years occupied the position of a director in the Bank of England, whilst he was really deeply insolvent. These original causes were apart from derivative causes: the occasional failure of relations who had been misled to become sureties; or such cases as have since occurred on the failure of the Bank of Glasgow. I reported the result of my enquiries, and then returned to the service under the commission in which I was engaged, and had nothing more to

do with this topic of bankruptcy. But I have been recently informed that the conditions which prevailed then of the general absence of causes of bankruptcy, which no ordinary prudence would avert, prevail now. A member of a large firm in Manchester tells me that of some hundreds of bad debts, not above one could be found that was attributable to unblamable imprudence. When failures occur there under manufacturing depressions or storms, it is generally found to be only the rotten timber—the decayed firms—that have gone down. I am told that this is really much the common condition of insolvency or of bankruptcy at present in the metropolis. If there had been any proceedings for legislation in bankruptcy, I should have been prepared to submit some provisions which I would now submit as available. One of them would be that there should be a statutory provision of a pre-appointed condition for simple contract debts, namely, that it should be presumed, unless the contrary were expressed at the time, that the loan was required for the ordinary business of the borrower. Thus in the case I have mentioned of the bookseller, who borrowed money, the implied understanding of the banker or the lender would be that the advance was for use in the bookselling trade, the conditions and rules of which were known; but if it were known that it was for a speculation in hops, it would be known that a threefold risk (requiring a threefold premium) would be incurred at the expense of the creditor. Such a provision would

serve to check an immense amount of gambling speculation. Then it should be provided that any borrowing of money by a debtor, knowing at the time that he is insolvent, should be dealt with as obtaining money on false pretence, *i.e.*, the implied pretence being of solvency. It should be left with the Board of Trade to deal with such conditions. I would propose also that the return of the cases of bankruptcy in the *Gazette* should state, 1st, the total amount of the debt; 2nd, the chief cause of the bankruptcy; 3rd, the assets; 4th, the costs; and 5th, the dividend declared. These returns would be as short as stated, and would have important moral and economical results. To set forth in the case of the bookseller that the main cause of bankruptcy was "speculation in hops," would be a relief to the bookselling trade from the discredit of undue hazard; and so "speculation in pearl fisheries" by another tradesman; and so with expenditure at double income. The Code Napoleon provides that tradesmen shall keep books, which on occasion shall be accessible. That is a provision which should be adopted by this great commercial nation. In enquiries as to crimes, I was informed that a great deal of embezzlement was engendered by bad book-keeping. The declaration of the dividend from the bankrupt estates would be an important piece of information. From some information I obtained at the time it appeared that international credit as denoted by the amounts of dividends paid stood thus:—Spain was the highest,

that is to say the old commercial houses of Spain; France next; Holland next; England fourth—to which I expect it would be sunk by law expenses; the United States lower than England; and the lowest of all South American States. I do not know how it might be now, but a return of the dividends paid would help that and much other economical information. In respect to the executive machinery for an improved bankruptcy law, which Lord Sherbrooke contends should continue with the Lord Chancellor in the High Court of Chancery, I would ask what has been the long outcome of that high authority,—“the unquestioned head of the English bar,” but the failure of attempt after attempt to remedy, and the disgraceful mess which it is now attempted to get into order? Lord Sherbrooke says “he sees no reason why the Board of Trade should displace the Chancellor, nor why an official of less rank, and infinitely less knowledge, should displace the unquestioned head of the English bar.” I presume to offer a reason for the change:—that, in fact, the lower officer, be he commissioner, or head of a department, giving his entire attention to the one subject, and having the widest range of experience and observation upon it, instead of having infinitely less knowledge, cannot fail to have infinitely more knowledge of it, and the bearing of the public interests affecting the administration, than can be obtained by the fragmentary attention of the high officer, which has so egregiously failed of the required remedies!

To remove the subject out of that court is to remove it out of a region of ruinous expenses and of obstruction. I venture to offer a precedent. In some enquiries as to land drainage for sanitary purposes I found that the existence of swamps, and the sources of disease, and of inferior production on settled estates were really with the Lord Chancellor, under whose jurisdiction, for the prevention of waste, settled estates were, and the expenses of whose jurisdiction frequently equalled the cost of the drainage works required to be executed. I wrote official papers to show the necessity of removing that subject matter out of the jurisdiction of that court. This was done; it was placed in the inferior jurisdiction of the Commons Enclosure Commissioners, who now do for pounds, and with the aid of officers who are specialists, what would have cost hundreds of pounds under the procedure of the Court of Chancery. Some millions of money have been productively applied to the improvement of vast tracts of land that would have remained undrained and in swamp and marsh if it had remained under the baleful jurisdiction of the High Court of Chancery. I trust that similar results will follow from confiding so large a proportion of the trading interests of the country as is comprised in the measure in question to the Department of Trade.

The observations made above were read in 1882, and it may be a puzzle to some how they can apply to the *Health of the People*. They do, however, really apply very closely. We may lay it down as a rule


of the truest quality that whenever there is a departure from the strict and well regulated mode of life into speculation, and what may be justly called intemperate mode of business, there is a lapse into an intemperate mode of life. The mind becomes irritable. The quiet and ordinary business of living for the wise purpose of keeping the animal machine in natural working order is forgotten or set aside. Meals are considered of secondary moment, relaxation is looked upon as a waste of time, every interval of time is utilized as of first importance for some speculative labour, and at last the bankruptcy of the body becomes as inevitable as the bankruptcy of the purse.

No bankrupt can, therefore, except under the very rare exceptions where failure comes from causes absolutely unforeseen, and absolutely unavoidable, be considered as a man in a sound sanitary state. He is a man whose nervous organisation is disabled, whose steady and honest reasoning powers are disabled, who has ceased to be true and conscientious to himself and his own organic interests, and whose health is as uncertain and shaky as the speculative business which he is struggling to uphold and maintain.

Possibly all speculation however wild and treacherous would in a measure succeed, if the vital powers of the speculator expanded with his desires. But there is a point where Nature interposing says, Stop! hitherto shalt thou go and no further for thy own selfish ends: thy day is over, and if thou try further thy life is the forfeit.

CHAPTER X.

THE DISPOSAL OF THE DEAD.

S supplementary to my work on the sanitary condition of the labouring classes, I presented to Sir James Graham, Principal Secretary of State for the Home Department in 1843, a report on the practice of interment in towns as a result of a special inquiry into the whole of that subject.

This supplementary labour furnished matter for a considerable volume. In the present chapter I can only offer an abstract of the work and of the results which sprang from it.

EXPOSITION OF EXISTING EVILS.

I set forth by indicating that the emanations from human remains were of a nature to produce disease, and to depress the general health of all who were exposed to them, and that interments in the vaults of churches, and in graveyards surrounded by inhabited houses, contributed to atmospheric impurities by which the general health and the average duration of life were diminished.

I argued that the places of burial in towns and

crowded districts were destitute of proper seclusion and means for the performance of impressive religious service; that feelings of aversion were manifest at the increased removal or abandonment of family vaults and places of burial; and that the greatest injury was done to the health and feelings of the labouring classes in many populous districts from the long retention of the body, before interment, in the single rooms in which the families of those classes live, sleep, and have their meals, and where the deaths in the greater number of instances have taken place; and that the system condemned often led to extravagant expenditure for funerals,—an expenditure which could not be less than between six and seven hundred thousand pounds for London, and between four and five millions for the whole of England.

SUGGESTED REMEDIES.

After describing the general means for the abatement of the evils of interments by sanitary measures which diminish the proportionate numbers of deaths and funerals, and increase the duration of life, I passed on to explain, on several special grounds, moral, religious, physical, and the best usages and authorities of primitive Christianity:—

(1) That the practice of interments in towns, in burial places amidst the habitations of the living, and the practice of interment in churches, ought for the future, and without any exception of places or acceptance of persons, to be entirely prohibited.

(2) That the necessities of no class of the population in respect to burial ought to be subjected to commercial associations for emolument; but that national cemeteries of a suitable description should be provided and maintained, as to the material arrangements, under the direction of officers duly qualified for the care of the public health.

(3) That for the avoidance of pain and of moral and physical evil arising from prolonged detention of the dead in rooms occupied by the living, and for removing the painful apprehensions of premature interments, houses ought to be instituted in every town, for the use of all classes of the community, for the immediate reception and respectful and appropriate care of the dead under superior and responsible officers.

In another part of the report I dealt with the abatement of excessive charges for funereal materials, decorations, and services, suggesting that provision should be made, by the officers having charge of the national cemeteries, for the supply of the requisite material and services for securing to all classes, but especially to the poor, the means of respectable interment at reduced and moderate prices, suitable to the station of the deceased and the condition of the survivors.

For the sake of abating the apprehensions of premature interment, and for bringing responsible aid, counsel, and protection within the reach of the most destitute survivors, as well as for protecting the people against continued exposure to ascertained and pre-

ventable causes of disease and death, I proposed a revival of the principle of the early appointment of searchers, and that no interment whatever should be allowed to take place without the verification of the fact and cause of death by the Medical Officer of Health; and that in all clear and well-ascertained cases of death from immediately removable causes of disease and death, officers of health should be invested with summary powers, and be responsible for exercising them for the removal of such causes and for the protection of strangers from exposure and danger from them.

ON PAYMENTS FOR INTERMENTS ON THE NEW SYSTEM.

Some carefully-considered propositions were made in this report for the repayment of principal and interest incident to the introduction of the new system as part of the reduced expenses for future interments. Burial fees and existing dues should be collected, it was urged, upon interment, and should form a fund from whence should be paid the compensations which Parliament might award to such existing interests as it may be necessary to disturb, and for the erection of new cemeteries; and that any surplus that might hereafter accrue should be applied to means for improving the health of the living. With the assistance of independent medical officers of health the service of interments in national cemeteries might, it was calculated, be so improved that, with the funeral service better

solemnised, the expense of funerals, in the metropolis at least, would be reduced to one-half the then existing amount, with full compensation to all who might have legitimate claims for compensation for losses arising from the alteration of existing practice.

ADVANTAGES FROM THE SUGGESTED CHANGE.

The advantages which the measures proposed offered to the classes were thus recapitulated by the author in the final summary.

To take the poorest class: the labouring man would (in common with the middle and higher classes) gain, on the occasion of his demise, protection for his widow and surviving children, that is to say:—

Protection from the physical evil occasioned by the necessity of the prolonged retention of his remains in the living and sleeping room.

Protection against extortionate charges for interment, and against the impositions of unnecessary, expensive, and unseemly funereal customs, maintained against the wishes of private individuals and families.

Protection and redress to his survivors or the living against any unfair or illegal practices, should any such have led to the death.

Protection against any discoverable causes of ill-health, should any have attached to his abode or to his place of work.

Protection from the painful idea (by arrangements preventive of the possibility) of a premature interment.

Protection of the remains from profanation, either before or after interment.

Protection such as may be afforded by the information and advice of a responsible officer, of knowledge and station, in the various unforeseen contingencies that occur to perplex and mislead the prostrate and desolate survivors on such occasions.

Added to these would be the relief from the prospect of interment in a common graveyard or charnel, by the substitution of a public national cemetery, on which the mind may dwell with complacency as a place in which the sepulture may be made an honour and a privilege.

The advantages derivable to the public at large have already been specified, in the removal of causes of pain to the feelings of the living connected with the common burial places; they would also gain in the several measures for protection against the causes of disease specified as within the province of an officer of the public health to remove; and they would also gain in the steps towards the creation of a science of the prevention of disease, and in a better registration of the fact and the causes of death.

To use the words of a great Christian writer, that all this, which constitutes the last office of the living, "to compose the body to burial," should be done, and

that it should be done well and "gravely, decently, and charitably, we have the example of all civilised nations to engage us, and of all ages of the world to warrant, so that it is against common honesty and public fame and reputation not to do this office."

There is a further topic to which I beg now, in 1888, to advert, because it bears on the present burning question of the overcrowding of the poorest of the population—namely, the measures proposed for the discontinuance of the practice of intramural interment. I was charged by the Government to examine the subject, and after making a large collection of experiences, presented a report upon it in a supplement to my report in 1842 on the sanitary condition of the labouring classes. Under our first General Board of Health we renewed inquiries into the subject, and presented a second report on it in 1850. The most horrible evil requiring to be dealt with was the prolonged retention of the dead amidst the living in the family's single room—a retention for days, and even for weeks, until money could be obtained to defray the expenses of the funeral. Besides the physical evils resulting from this practice in the spread of infectious diseases, there were also the moral evils arising from the disrespect for life which it produced, and still produces, for it continues to this day unnoticed. I prepared a plan of an executive machinery, such as has been applied beneficially in some of the Continental cities, for ensuring the presence of an

officer of health immediately on the spot, charged to examine the cause as well as the fact of death, and empowered to give orders for the immediate removal of the body to a suitable mortuary, to be duly provided, and when the exciting cause of death was removable, to take measures for the protection of the survivors. When the cause was the unsanitary condition of the house, the inquiry would have frequently led to the condemnation of that house as unfit for habitation. The plan I proposed would necessarily have occasioned an examination into the conditions of between twenty and thirty thousand deaths which happen annually in the Metropolis from preventable causes, and ought to have led to some efficient action for relief. It required provision for mortuaries and cemeteries, and for services under unity of a character befitting an elevated community, and created, I trust, impressions of moral influences which now are frittered away in the establishments under the vestral disunity.

The proper removal of between one and two thousand dead weekly from the midst of the living, their removal with individual care, and their interment with propriety, appeared to be a task which could only be accomplished by a superior executive service under unity of administration, of which there was then no immediate prospect. I submitted my views in the following terms:—"I would, in conclusion, beg leave to repeat and represent urgently that Her Majesty's Government should only set hands to this

great work when invested with full powers to effect it completely; for at present there appears to be no alternative between doing it well or ill: between simply shifting the evil from the centre of the populous districts to the suburbs and deteriorating them; fixing the sites of interments at inconvenient distances; forming numerous, separate, and weak, and yet enormously expensive, establishments; aggravating the expense and the physical and moral evils of the delay of interment; diminishing the solemnities of sepulture; scattering away the elements of moral and religious improvement; and increasing the duration and sum of the existing evils. There appears to be no distinct or practicable alternative between these results and effecting such a change as, if zealously carried out, will soothe and elevate the feelings of the great bulk of the population, abate the apprehensions of the dying, influence the voluntary adoption of beneficial changes in the practice of obsequies, occasion an earlier removal of the dead from amidst the living to await interment and ensure the impressiveness of the funeral service, give additional securities against attempts on life and trustworthy evidence of the fact of death, with the means of advancing the protection of the living against the attacks of disease, and, at a reduced expense, provide in well-arranged national cemeteries places for public monuments, becoming the position of the empire amongst civilised nations."

A second report was called for from our General

Board of Health, and with a view to a commencement, one of the trading companies' cemeteries was purchased, but the practical difficulties were found to be so great under the existing conditions of disunity, that further proceedings in that line of amendment were abandoned. Deep-seated evils thus remain as they were, especially the prolonged retention of the dead amidst single-chambered families, who, in many districts, comprise 60 per cent. of the population. The attainment of complete unity in the metropolitan administration would open up prospects of grievously-needed relief in this respect.

ECONOMY IN THE INTERMENT OF THE DEAD.

On the subject of economy in the interment of the dead I once made comparison, as between London and Paris, and to the advantage of Paris. In London there were over six undertakers available as competitors for each funeral, and yet, under the circumstance of the occurrence of a death,—there being no time to seek about or make inquiries, so as to enable the friends to secure a selection, founded upon a comparison of charges,—the service was commonly a monopoly. The expense to the survivors of all classes above the class of paupers, and particularly to the most respectable class of mechanics, formed a grievous addition to the evils and afflictions of bereavements by death. The charges made were exorbitant, and the character of the services rendered was in every respect low and objectionable, only befitting an in-

ferior religious and inferior social condition of society. In the more densely peopled districts of London nearly 60 per cent. of the population died in the same room in which the survivors lived. When a father of a family died, the body remained in the living and sleeping rooms of the survivors, whilst the widow was abroad seeking aid or raising the money to defray the excessive expenses for what would be called a respectable funeral, which funeral was often not carried out for days after the decomposition of the dead had commenced.

The expenditure of the funeral, when at last it was arranged, was out of all proportion to the necessity. The allowance made by burial clubs in England was from £5 to £10 for the funeral of an adult member, the lowest allowance £3. But the range of expense for a funeral in England, exclusive of pauper funerals, might be said to be from £3 up to £100 for persons in fair or affluent circumstances, and from £300 to £500 for persons of rank.

All this vanity and difficulty was and is due, according to our essayist, to the false principle of competition *within* the field of the service demanded. In every case there are more candidates in competition than are required; in many cases fees and bribes add to cost; in many cases useless trappings and shows entice to much further cost; and in all cases there is the chance that they who are forced to pay the cost, the persons under bereavement, are being unjustly punished, because they are already in trouble,

and are not in a position to resist a tax which is as false as it is heartless.

In Paris and other continental cities the entire field of service for the interment of the dead was put up to competition for limited periods of time, *i.e.*, for terms of years sufficient for the renewal of carriages and of establishments. To suit the means at the command of the different classes of the community, the scales of cost were divided into series of nine, so that the average of expense might run from 15s. to £145 in English money, out of which sum, however, a proportion of 60 per cent. went, at the time when the essay before us was written, for the support of public worship. The average expense of a funeral in Paris, consequently, for respectable persons, would be a little over £14 of English money, or one-half of what would be the expense in the same class of persons in England. To show the entire difference of expenditure between England and Paris, the sums paid for 28,000 funerals in Paris and for 45,000 in London were computed. In Paris the entire expense, including the tax for the gorgeous rites of the Roman Catholic Church, was £80,000 for the 28,000 funerals, or rather over £2 17s. 2d. per funeral. In London the entire expense for the 45,000 funerals, without any special Church tax, was £626,000, or over £13 18s. 2d. per funeral.

Further, by computing what would be the estimated expenditure in London under a consolidated system, and under competition for the public service, I came

to the conclusion that the £626,000 would be reduced to £250,000, including the buying up of the then existing cemetery companies, and improving the service at every point.

MODES OF DISPOSAL OF THE DEAD.


I have spoken again in the present year—May 14th, at a meeting held at Grosvenor House under the presidency of the Duke of Westminster—on the question of “Sanitation of Interments.” The occasion was the annual meeting of the Church of England Funeral Reform Association, and the question chiefly discussed had reference to the mode of disposal of the dead. The Church of England Funeral Reform Association advocates earth-to-earth burial, attaching primary importance to the recognition of the Burial Service of the Church of England as the basis of their action, and emphasising the advantages of their method on the grounds of public health. They oppose at the same time the principle of the disposal of the dead by cremation, and so there are now two rival camps of reformers on the subject now in hand. It would not become me, who took so active a part in introducing the public cemeteries, which now form so distinctive a feature of our English cities and towns, to say a word against earth burial; and in doing so I should be going against my own views, because I feel that earth burial is the most natural of all methods, and that for man to return to the mother that bore him, is one of the strongest as well as the oldest of

human ideas. Moreover, if burial be conducted on the immediate earth-to-earth system, all reasonable sanitary requirements are fulfilled so long as a sufficient area of burial surface is provided for every community.

To be quite fair to the advocates of cremation, I am willing, however, to add a special amendment to the above general rule. I foresee that in great communities—like that of London, for example—the time may come when, from the absolute insufficiency of space, the earth-to-earth system may have to be supplemented by cremation. I also am aware that many intelligent persons prefer, for their own parts, that after death their bodies shall be cremated rather than buried, even on the earth-to-earth plan. In the presence of these two undoubted facts I should suggest that every cemetery should be provided with a crematorium, and that cremation, under the exceptional circumstances indicated, should replace burial in the earth.

CHAPTER XI.

THE VICTORIAN ERA OF PROGRESS IN THE HEALTH OF THE PEOPLE.

Y a happy combination of circumstances the reign of our Queen has been signalized as an era of health-promoting progress unapproached in the history of any reign or any epoch in the history of the world. Dr. Richardson has told us that it surpasses the Augustan Era itself in this particular, and, agreeing with him, I bring, in proof, this part of the present work to a close by recapitulating some of the leading facts as to what has been accomplished during the Victorian period.

PROGRESS IN SANITATION.

It is now generally accredited that the full development of sanitary science, first moved in 1828, was accomplished in the report on the condition of the labouring population of Great Britain in 1842, and thence by the development of a system of circulation against stagnation. In the reign of Queen Elizabeth; the death-rate in the metropolis was 40 in 1,000; at the commencement of Her Majesty's reign it was 24 in 1,000. It is now reduced to 19 in 1,000, and

the like reduction has been effected throughout Great Britain, which is now the most healthy of all the great States of Europe. The mean duration of life has been advanced two years to all the population of Great Britain. But practical examples have been established of the reductions of the common death-rates by one-third and one-half, which demonstrate the practicability of a further reduction of the general death-rate by 5 in 1,000, and a general augmentation of the duration of life by five years.

In the district half-time schools of mixed manual and mental labour, the death-rates of the children who enter these institutions without developed disease upon them have been reduced to one-third of the general children's death-rate. In the prisons, where sanitary works have been completed, epidemic visitations have been banished, and the death-rates of those who enter without developed disease upon them, have been reduced to one-third of the general death-rates. In the model dwellings, the death-rates of the class have been reduced by one-half, and, as premised, the mean duration of life in such model dwellings as the Prince Consort erected is augmented by ten years.

As it now stands, the death-rate in Her Majesty's dominions is the lowest of any great State in Europe. If in France the death-rate were reduced by sanitation to the level of the death-rate in England, 3 in 1,000 would be saved, that is, 112,000 lives per annum. Germany is pre-eminent in the reduction by sanitation of the death-rate of the army; but by a reduction

of the death-rate of the civil population to the present English level, it must be reduced by 6 in 1,000, by which 135,600 lives would be saved annually. Italy must reduce its death-rate by 8 in 1,000, which would effect a saving of 224,000 lives; and Austria must have a reduction of 8 per 1,000, which would effect a saving of no less than 118,000 lives annually.

Where the death-rates are high, then, as a rule, agricultural production is low. In France the production of wheat is less than one-half what it is in England, or less still than in Scotland; and the whole of the vegetable production in Germany is about one-half what it is in England; and so of the greater part of Italy, and, so far as is known, in Austria. In France, Belgium, and Germany, Mr. Jenkins, who examined the condition of the cottar proprietors, declares that they work twice as hard for half the wages of an English agricultural labourer.

PROGRESS OF MILITARY FORCE BY SANITATION.

By a special Sanitary Commission, first moved by Sir Edwin Chadwick, and executed by Sanitary Commissioners under his training, the second army in the Crimea was saved, and brought back in better health than it had at home; and by the application of the experiences gained by the same Sanitary Commissioners, on his representation, the death-rate in the Indian Army has been reduced from 67 in 1,000 to 14, in the Home Army from 17 to 8 in 1,000, and in the Colonial Army in proportion; and it is

estimated that during the last 20 years there has been a saving by sanitation of 7,300 men per annum, or in the 20 years, 146,200, and of money, £731,300, to one-third per annum the death-rate, or for the 20 years, £14,627,700, with more yet to do for the army, and everything to do for the civil population of India, and for making it permanently habitable by the British race. It is lower by 3 in 1,000 than in France, where it would save 112,800 preventable deaths annually; it is lower by 6 per 1,000 than in Germany, where its adoption would save 135,600 annually; it is lower by 8 in 1,000 than in Italy, where its adoption would save 224,000 lives every year; it is lower by 11 in 1,000 than in Austria, where its adoption would save in that empire no less than 418,000 lives annually, by the proposed works of sanitary prevention for the advancement of the health of nations. In our own colonies, from the absence of sanitary science efficiently administered, the children born, or 50 per cent., are in their graves before their fifth year. In good sanitary conditions at home, the deaths of children under five years are reduced to 10 per cent.

PROGRESS BY SANITATION IN WORKSHOPS.

By a Commission of Inquiry into the labour of young persons in factories, measures of sanitation were adopted for the protection of young children from the evil of overwork, and also against exclusion from education; and an improved system of education of mixed manual and mental training, on what is called

the half-time system, was introduced. The system has received its full development during Her Majesty's reign in the district half-time institutions for orphan children, and in the case of those who enter without developed disease upon them the deaths are reduced by sanitation in workshops to less than one-third of the children's death-rates prevalent amongst the general population, whilst by the increased force gained by sanitation, together with the industrial training on the half-time principle, the efficiency of three is imparted to two, or one-third more of force and aptitude and value in wages is imparted. The system is applied to industrial schools and reformatories, including some forty thousand children, with the result of a greater reduction of juvenile delinquency than is now, or has ever been, effected by any form of mental teaching. It is highly effective in the removal of social differences. Mothers have declared that it makes their children appear to them as of another race, and Sir John Leutaigue and other school inspectors declare that it will serve to alter the character of a nation. On examination of this half-time system, it has been adopted by the German Government for the regulation of the labour in the factories and mines throughout the Empire, together with the regulations provided in the original measure for the protection of adult workers. It is adopted together with the executive central machinery of legislation and inspection. It has also been adopted in France for the same purpose. It includes much

saving by the transference of military drill and discipline from the adult to the juvenile and infantile stages of life.

PROGRESS IN THE PROTECTION OF LIFE AND PROPERTY,
BY NEW POLICE FORCE.

In a paper inserted in the *London Review* for 1829, the principle of the organisation of a Preventive Police, by substitution for the parochial night-watches was advocated, and as a result of this, which was the first and only exposition of principle, the Consolidated Police Force, under the direction of the Home Department, was instituted in the Metropolis. At the time of the accession of Her Majesty a Royal Commission was appointed to inquire into the working of the Parochial Constabulary. This led, by a partial adoption of the measures recommended, to the adoption of an organised Police Force in substitution of the unpaid Parish Constabulary, and with duties for the protection of life from calamities, as well as from crime. It has been proved, upon examination of particulars, that the expense of these provincial towns is not greater than the expenses of the unpaid parish constables.

An Italian statist, who has examined the comparative amounts of crime prosecuted in the different States of Europe, shows that of all the States it is the lowest in Great Britain. In the time of Queen Elizabeth the murders in the Metropolis would, at the same rate as now, have amounted to 150 annually ;

with the present population of five millions they have now averaged not more than eleven. In New York, the capital of the United States, the crimes of all sorts brought before the magistrates is 72,000 annually, or the same number that is brought before the magistrates from five millions of population in the Metropolis. In England and Wales the cases of vagrancy and mendicancy relieved amounted to 5,000 last year. In France the total was 50,000, and in Germany, on the last returns, it was 130,000.

The abuses of the Poor Law had in a great measure impaired thrift, and reduced the agricultural wage classes to conditions of serfage, and very rapidly reduced the value of landed property. Prime Ministers, including Peel, Huskisson, and Wellington, had given up in despair the attempt at remedies; when in 1832 a royal commission was issued, to examine the subject and devise remedies. Under the Commission, an independent plan, set forth in the report of Mr. Chadwick, was made, which was adopted by the Commission and by the Legislature. On the partial execution of that plan by 13,000 paid officers, with yet imperfect functions, a saving of upwards of three millions per annum was effected, and with a more humane administration, upwards of three millions per annum have been made over the general rate of the unpaid parish overseers. The wages of labour have been generally advanced by one-third over the previous rates, or two now receive more than three did formerly; and there is now a further reduction to an equivalent

amount available, with large improvements in the administration by a complete adoption of the original principles laid down, an adoption which has been sought by local administrators.

If similar savings of expense to those already effected had been obtained for commerce or manufactures, it would have ensured primary and anxious consultation for the future. I, however, put the non-consultation as to the means of the reduction of expense as a question of prudence, and the close mode of preparation by the cabinet method for legislation in such a case, as one of great danger, in confining the preparation to inside, and usually very limited, knowledge, of which some evidence has escaped and has provoked resistance.

The success of the Poor Law Amendment Act (which Mr. Gladstone recently declared to be, in his belief, the greatest measure of this century) was due to more close and extensive local examinations than had hitherto been made. If I had been requested to prepare a measure for amendment of County Government, although permanent paid officers recognise me as possessing the largest experience on the subject, I should have declined the task, unless I were allowed to make, or to direct to be made, as much as possible of local examinations. I should ask this for the information and assent of the people of the localities, and for their local representatives, as well as for the information of Parliament.

By the adoption of principles early moved for and

urged in papers for arresting political corruptions, by tests of qualifications for first appointments to Government offices, the corruption has been arrested, and the efficiency of the general administration of the service has been largely improved; and the principle has been adopted, and is in the course of introduction in the United States.

PART IV. .

HEALTH IN THE FUTURE.

(PROGRESSIVE HEALTH.)


PART IV.

HEALTH IN THE FUTURE.



CHAPTER I.

THE ACHIEVED AND THE POSSIBLE FOR THE HEALTH OF THE NATION.

 R. RUSSELL, the health officer of Glasgow, shows that during the last decade there has been a saving in Glasgow of not fewer than ten thousand lives, which saving he ascribes to reductions of overcrowding, more efficient scavenging, and other sanitary work, by which zymotic or foul air diseases have been reduced; so that, out of every ten thousand of the population, there have died of fevers only seven in place of twenty; only one in place of two of small-pox; nine in place of thirteen of scarlet fever; seven in place of eight of measles; twelve in place of fifteen of whooping cough; five in place of six of croup and diphtheria.

Those acquainted with sanitary science will be

aware that these are but minor advances. Yet the saving of the expenses of funerals, and of the curative expenses at the same rate as the common rate in England (of £5 per funeral for all classes, and £1 per case of sickness), will have been upwards of £250,000 for the decade—a reduction effected by the local sanitary service of the money burthen to Glasgow from preventable disease.

Now, the reduced death-rate of Glasgow is yet as high as twenty-six in a thousand; but I apprehend that there is no tenable reason why the death-rate there should be higher than the death-rate in Dover (the first town reported to our Board by Mr. Robert Rawlinson, our sanitary engineer), where it was once as high as that in Glasgow; but, since the works initiated by our first General Board of Health have been carried out, the Dover death-rate is now only fourteen in a thousand, which I take to be, nevertheless, only a passable urban death-rate.

Hence I take it that the present death-rate in Glasgow is still in excess by no less than ten in a thousand. I apprehend that the insurable cost for funerals and sickness will be found on examination to be now upwards of £400,000 annually for its half million of population, or upwards of £4 per house annually for each of its 100,000 houses. I am not prepared to state what was the cost of the chief factors of sanitation at Dover, or whether they were economically executed or not under the local authorities; but in some twenty towns in England

where the death-rates have been reduced by more than one-third, the cost of the works, as executed by the engineers of the first General Board of Health, were as follows. For a constant supply of water carried into every house, for self-cleansing drains that carried away instantly the foulest water from every house into self-cleansing sewers, and from them immediately out of the town by the combined works; the first charge, spread over a period of thirty years, was from 15s. to 17s. per house per annum, or less than one-fifth of such a charge as that arising from the preventable sickness and death-rate in Glasgow. But Glasgow has already its water-supply, and ought to have its preventable sickness and mortality reduced by complete sanitary works at proportionately less cost. The economy of such works as those specified depends on their execution by a common contract for a large area. Where such work is executed separately by the individual owner or occupier the cost is usually three times as great, with greater risks of failure. The expense of labour has been subsequently increased; but I may confidently state that in no case will the cost of the properly executed works and properly distributed charges for those of prevention be found to be so great as the existing insurable charges of excessive sickness and mortality.

It will be found on proper examination that where there is the greatest amount of work to be done by sanitation there is the greatest amount of money to be saved to pay for it. In some of the depressed districts

of Glasgow the death-rates are three times greater than in some of the well-to-do districts.

MORTALITY IN THE ELIZABETHAN AND VICTORIAN ERAS.

Instances of the beauties of mediæval art are revived and presented which raise associations of the beautiful with mediæval administrative institutions, as if all were befittingly beautiful in the conditions of the people, resulting from the self-government of their mayors, their aldermen, their guilds, their wards, the securities of their nightly watch, and the beneficence of their parochial administration. Whereas, to use the words of Hobbes, the life of man in general, under the then common conditions, was "poor, nasty, brutish, and short." According to John Graunt's reports, from the parish registers, the condition of the whole city, in the time of Queen Elizabeth, was very much that of a "slum." The death-rate was, in fact, that of a slum; it was more than forty in a thousand. But now, under some advance towards unity and centralisation, it is about twenty in a thousand, still including upwards of one-third of preventable deaths. The death-rate then largely exceeded the birth-rate, and the lesser population of the city at that time was kept up by immigration from beautiful rural districts; now the reverse is the case. The death-rate of the children under five years was then one-third, or thirty-three per hundred. It is now twenty-seven, and grievously too heavy. The deaths from old age, or the age

then called old, of seventy, were 7 per cent.; they are now sadly too low, but even in the city proper they are 18 per cent. It was a boast that the deaths from starvation were not more than one in a thousand, exclusive of a large omission of the deaths of infants. At that rate the deaths from starvation for the whole of the Metropolis would be 1,250 annually. But deaths from actual starvation, the privation of food, are now so rare as not to form a heading in the statistical returns. I got particular inquiries into the rare cases that did occur, and found that they really amounted to cases of suicide in neglecting to make due application for the relief now provided for the destitute. As to personal security, John Graunt boasted that not more than one in two thousand was then murdered annually, which he ascribes to the good local government. "The post of the government and the guard of the city being by citizens themselves, and that alternately. No man settling into a trade for that employment." "Whereas in Paris few nights escape without their tragedy." At that rate, the numbers of murders for the whole of the Metropolis would amount at present to 2,500 annually, whilst under the metropolitan police they actually amount to an average of no more than twelve for the whole five millions of population guarded by that force,—a population which approaches to that of the whole kingdom of England and Wales in the time of Elizabeth.

CIRCULATION OR STAGNATION?

"Circulation or Stagnation?" Such is the neat and concise form in which Mr. F. O. Ward and his colleagues put the sanitary question before the Congress of General Hygiene at Brussels.

In reproducing under this title the two principal speeches of this sanitary reformer, we believe that we shall render a service to all who are interested in this great cause—the cause of humanity at large.

Continuous Circulation is the fundamental principle of English sanitary reformers. According to their theory, the main conveyance of pure water into towns and its distribution into houses, as well as the removal of foul water by drains from the houses and from the streets into the fields for agricultural production, should go on without cessation and without stagnation either in the houses or the streets.

Hence they would do away altogether with cisterns and cesspools, which Mr. F. O. Ward designates as "two congenital forms of pestilential stagnation;" and wherever the double movement of water and sewage is hindered by the flatness of the land, they maintain complete circulation by steam power. It is at this last point especially that, according to Mr. F. O. Ward, the new system of drainage coincides with the general progress of the nineteenth century.

Hygiene by steam power (I quote his exact words) "is at once the logical extension and the necessary complement of *locomotion* by steam power, which

has of late been organised throughout the whole of Europe. The steam-engine, which has already quadrupled the means of transporting products from one place to another, will now quadruple the produce of the matter transported. This new application of the great invention of Watt will before long effect the same happy and astounding transformation in our domiciliary and agricultural arrangements, as it has already produced in nearly all the other branches of industrial art."

As to the method of thus applying steam to the service of public hygiene, it consists chiefly in the establishment of a vast tubular system. Mr. F. O. Ward has given us a rapid sketch of the physiological analogies and material organisation of such a system. In the words of this eminent sanitary reformer, "The discovery by the immortal Harvey of the circulation which goes on in the individual body has prepared us for the reception of the strictly analogous and fruitful discovery of the circulation in the social body."

Conceptions such as these, based as they are on numerous experiments and very positive results, deserve undoubtedly the impartial investigation which Mr. F. O. Ward and his colleagues solicit.

Let, then, these conceptions, these experiments, and these results be carefully examined; let the press and the public join in the discussion of them. The scheme proposed to us is no less than the reconstruction, on principles of a very bold nature, and hitherto but little known, of the material bases of civilisation.

What answer, then, must we give to this question, so concisely formulated, and apparently so simple, but of which the scope is immense:—"Circulation or Stagnation?"

LOCAL SELF-GOVERNMENT AND HEALTH.

Take the common case of a slum with a death-rate of forty in a thousand, and of the expenses it entails on the community. There will be twenty-five funerals at five pounds each, and at least twenty times that number of cases of sickness at one pound each, every fifth case on the average being that of an adult, entailing, on an average, a loss from disability for two and a half weeks at one pound per week, making one thousand eight hundred and seventy-five pounds per annum of expense for one thousand. Let us make a rough estimate of the immediate loss merely in money, apart from the suffering and misery resulting therefrom, caused by an excess of ten deaths per thousand, the amount by which I maintain the present death-rate could be diminished by good sanitation. For every thousand of the population, then, we have ten unnecessary funerals, at say five pounds each, or fifty pounds. For every such avoidable death there will be, according to the experience of benefit societies, and much more than that in the experience of the army, twenty cases of sickness, or two hundred in all, at a cost of one pound each, or two hundred pounds. Of these cases of sickness, according to the experience of friendly

societies, about one-fifth will cause a loss of wages for two and a half weeks on the average, or two pounds ten shillings; for forty cases, therefore, one hundred pounds, making in all, a total annual loss or unnecessary expenditure of three hundred and fifty pounds for each thousand inhabitants, or seven shillings per inhabitant per annum,—for the population of Manchester, one hundred and forty-eight thousand. This amounts *annually* to fifty-one thousand eight hundred pounds, or, in other words, to the interest at 5 per cent. on more than one million of money. It will be in the like proportion for Salford, Prestwich, and other connected districts.

The proportion of the inhabitants over the whole district appears to be five per house. In the more heavily death-rated sub-districts, needing the first attention, where there are forty or more deaths per thousand, there are usually to be found one family or more to a single room; but, taking the general average of five to a thousand, it makes the loss or excess of cost to be thirty-five pounds per house per annum, which, at 5 per cent., represents a capital of thirty-five pounds per house. The main works which I have specified were executed under the General Board of Health, at a distributed cost of seventeen shillings per house per annum; and this, capitalised as before at 5 per cent., amounts to seventeen pounds per house. Making every allowance for the increased rates of wages, etc., the cost of the requisite works cannot possibly reach the sum of thirty-five pounds per house, which

represents, at a very moderate estimate, one factor only of the loss due to their absence, namely, the sickness, the loss of labour, and the funerals, to say nothing of the cost of the citizen, not to speak of the misery and pain.

This, however, is exclusive of the value of the individual life lost, which cannot be less than one hundred pounds. In the United States it is rated at double that sum ; but, taking it at the lowest sum, the annual value of life lost will amount to one hundred and forty-eight thousand pounds ! There is, moreover, an excessive expense of police and penal administration, which is chiefly occupied with heavily death-rated populations and places.

It appears to me to be absolutely necessary, upon such experiences, to speak out against the ineffable conceit and ignorance shouted out as to the excellence of our self-government, as if it were the glory of our age and country ; whilst really, in its existing condition, it will be found to be, in truth, the worst of any we have. It is within compass to say that of every two deaths from typhus, one at the least out of every three is due here to that same government. Of the scourge of rheumatism, more than one half is now due to it. One result of insanitary conditions, especially in childhood, is the early disease and loss of teeth. The odds are, that most raging toothaches that are endured here may be found to be due to the conditions of the local misgovernment.

HEALTH PROGRESS IN INDIA.*

Let me state the last results, and the economies of sanitation in the Indian army. The former death-rate per 1,000 of mean force was 69. For the last decade of the returns, 1869 to 1878, the death-rate has been 20 to 1 per 1,000 of the aggregate force of 518,899. The actual deaths during those ten years was 11,815. The aggregate saving of life for the decade has, therefore, been 328,805 lives. The old sick-rate was at least 100 per 1,000; but during the decade it has been (though still too high) 56·67 per 1,000. There has been an aggregate saving of sickness during the decade of 25,085. Add the saving of sickness to the saving of 28,085 from premature death, and we have a total saving of 53,217 of force, which at £100 per man makes an aggregate saving of £5,321,700 for the decade, or £532,170 per annum.

Leaving these points, let me go on to show the economies of money and of force in the home army. The former death-rate was 18 per 1,000. During the last decade it was 7·769, being an aggregate saving of 7·612. The actual death-rate was 12·51 per 1,000. The sick-rate was about 50 per 1,000; during the decade it has been 39·38. The grand total of the saving, to be made known for the examination of the War Minister, has been, for the home army, £1,494,100 for the decade, or an aggregate strength of not less than 878,925 men, or £149,410 per annum.

* Speech delivered at Sanitary Congress at Croydon.

Let me conclude with the statement of the savings effected in the army serving in the colonies, of which the aggregate force during the ten years was 240,876 men.

The former death-rate was about 30 in the 1,000. The aggregate at that rate would have been 7,226. The deaths during the decade were 2,427, or a death-rate of 10·7 per 1,000, and an aggregate saving of 4,839 deaths. The former sickness rate has been estimated at 70 per 1,000; the latter at 39·81 per 1,000. The total saving of money has been during the decade on this branch of military administration £1,211,000, or £121,000 per annum.

The grand total saving, brought to our knowledge and to the consideration of Ministers, and all who are interested in financial questions, is that during the decade there have been no less than eight millions and a quarter, or £882,000 per annum saved, with a saving of force of 40,000 men from death, and more than that from sickness, or of 8,227 men per annum.

HEALTH REMEDIES FOR IRISH DISCONTENTS.

By the combined application of factors, practically demonstrated, I am confident that the death-rate of Dublin may be reduced one-half. For myself, I must say that I consider the Irish working man extremely unfortunate in the misdirection of efforts for his relief. In my collection of experiences of him in England, I found general expressions of respect for him by employers, as respectable and respectful, and as being

good in conduct when rightly dealt with, and more loyal than even English workmen. On such testimonies I stood alone for a time in contending for the introduction of the compulsory system of relief for the able-bodied, which has been well justified in Ireland.

It appears to me that one of the largest political mistakes, leading to the misdirection of effort, is in overlooking the effect of the physical upon the moral conditions of populations. In England I have always found, in local inquiries, that the seats of epidemic disease, the results of bad sanitary conditions, are the seats of irritation and of disturbance, of crime, and the chief sources of the chief occupation of the police in repression. Some time ago I got out evidence of the influence of the physical condition on a large scale in Ireland. I took the four counties where the proportion of mud hovels to the population was the highest, and compared them with the four counties where the proportion was the lowest. The four counties where the proportion of mud hovels, cabins with only one room, was highest, showed 61 per cent. of such hovels. The four counties where the mud hovels were the lowest showed 29 per cent. In these highest the proportion of deaths from epidemics was forty-seven, whilst in the lowest it was thirty-five. In the most mud-hovelled populations the mean age of all born was only twenty-six years and eight months. In the counties of the lowest proportion of mud hovels the mean age of death was thirty-three years and four months. But the mean age of death of the English

agricultural labourer was and is fifty and fifty-six years of age, with much for us yet to amend.

The contrast as to the crimes of violence and passion was, as I had anticipated, greatest in the four counties where the proportion of mud hovels was highest. There the crimes were as seventy-two, whilst, in the four counties where the proportion of mud hovels was the lowest, it was as thirty-two. And so it will continue to be where the population is in low physical conditions; as Jeremy Taylor has expressed it, "Man is kept desperate by a too quick sense of constant infelicity." Early in my sanitary work I wrote papers to urge a measure of general land drainage as a primary sanitary measure, for the reduction of the diseases of damp and stagnant moisture, as well as for increase of agricultural production. I urged that the permission to drain settled estates should be taken out of the Court of Chancery and placed in the hands of a special authority, with power to regulate the advances of loans and the application of loans for the purpose. So far as that measure has been carried out, it has answered the purpose as a measure of improved agricultural production as well as of sanitation. All round it has paid itself in seven years. Now Ireland is wetter than England; it has more land for productive improvement, as well as for sanitary improvement, than England.

I leave the reader to draw his own inferences as to what might speedily be done through health measures for the redemption of Ireland from her leading causes of distress, and naturally resulting disturbances.

CHAPTER II.

VENTILATION FROM CLOUDLAND.



FORMED a project in January 1886 to draw down air, by machinery, from the upper couches or strata of air and distribute it through great cities, like the Metropolis. How the idea arose in my mind may be stated as follows.

On the repeated sight of a great blanket of fog spread over the Metropolis I discussed the subject with Dr. Neil Arnott, who was a man of distinguished mechanical ability, and our conclusion then was that we might form a Pure Air Company, which would engage to draw the air from a suitable height above the common layers, and distribute it into houses by engine power, or as gas is distributed, and do it with a profit, at a very low rate, or for some few shillings a year give even a better air than people generally obtain in suburban residences.

I propose to take advantage of all buildings of great height, and to bring down from their highest part pure air; or even in different parts of a large city like London to build special towers for the purpose.


To what height these towers should reach a general estimate is supplied in the subjoined statements.

The different degrees of purity of air at different altitudes have been determined by important experiments carried on at Paris by Messieurs Miguel and Davey. So far as they have been carried, they are entirely corroborative of the purity of the upper air. Thus, at the lantern of the Pantheon, which is about 310 feet high, the air is found to be twenty times more pure than the street air in the vicinity of the Rue Rivoli. In high altitudes of 2,000 mètres no microbes have been found, whilst in the open part of Mont Louris at Paris 7,000 were found in the cubic mètre, and in the street of the great Rue Rivoli there were 35,000 in the cubic mètre.

In Paris they are now building the highest tower in the world. This tower is said to be intended as a temporary wonder, from the top of which visitors will be able to see a larger area of the surface of the earth than from any other post of vantage on the earth. This, no doubt, will be exciting and very popular; but if the builder will provide in his high place a shaft, by means of which he can supply Paris with breath from Cloudland, his temporary idea will become permanent, and he will be known for generations to come as the celestial ventilator, the bringer of the pure air of the skies into the dwelling places of men.

CHAPTER III.

THE MALTHUSIAN THEORY AND THE FAMILY OF THE FUTURE.

 HAVE the advantage over perhaps all who are now diseussing the Malthusian Theory that I know, personally, the distinguished author of the Theory; and in our Political Economy Club, of which I am now the father, and of which he was a member, I told him the fact of the quick reproduction of human life in the high rated districts of death. He was quite astounded that this point had escaped his observation, and the incident forms a fitting prelude to this short essay.

Since Malthus propounded his doctrine of population, what have been the experiences upon it?

When Malthus wrote his book on the *Pressure of Population on the Means of Subsistence*, the population of England was ten millions, and in the manufactories the wages were low, and the prices of provisions were high. Take Lancashire: the wages given at the commencement of the cotton manufacture were not more than five shillings per head of the cotton mill workers, man, woman, and child; that is to say, if there were three workers in a cottage, the aggregate wages they received were not more than fifteen shillings per week. In agriculture, in Scotland,

Adam Smith states that the wages for adult workers at that period were eightpence a day. The wages now in Lancashire average 17s. per head of the mill workers, and in a cottage of three—man, woman, and child—the wages may amount to £2 10s. per week. The agricultural wages in the highly cultivated districts in Scotland are now about £1 a week for the man, six shillings for the woman, and four shillings for the boy, besides a good cottage and other advantages.

Now it may be stated as an economical principle that the fact of an artisan being employed at wages denotes that over and above his own means of subsistence he earns enough to yield a profit to the capitalist who employs him; and the continued advance of wages denotes a continued diminution of the pressure of that population on the means of subsistence. And this has been going on, as in Lancashire, with the increasing introduction of labour-saving machinery.

It has been stated, in support of the Malthusian theory, that “the poorest classes in all European countries have been continually underfed because of the constant tendency of reproduction to go on faster than food can be procured at home or purchased from abroad.” Speaking of this country, the evidence is of injurious over-feeding. In the prisons, with the dietaries of the lowest cost, almost entirely vegetarian, there has been the highest amount of health beyond that enjoyed by the out-door population; and how is the theory consistent with the fact of a drink-bill of upwards of £100,000,000, chiefly injuriously expended by the wage class?

At the beginning of the century, the spinning of a pound of cotton cost one shilling; it now costs one halfpenny, and there is now paid the highest amount of wages with the lowest cost of production of any in Europe. The population in Lancashire has increased from half a million to three millions and a half, and it is going on increasing; whilst the death rate has been considerably reduced. A Cabinet Minister is reported to have stated in a recent speech: "The vast questions connected with population have to be considered. It is growing at a rate which I do not like to cite, but you know Professor Huxley's estimate. Are we taking measures to deal with that population in an intelligent and far-sighted way? I venture to think that we are taking very few precautions, if any. And when you come to think what that question of population involves, you must see that it is one which will force itself on our attention in a very unmistakable way before long. In the first place, it forces on us the great question of the land of this country, which remains limited, while the population knows no limit to expansion." This quietly assumes the limited cost of production, and the limited amount of the produce. Sir Robert Kane, in his work on the *Industrial Resources of Ireland*, declares that the cultivable land of that country is capable of a threefold production greater than is now obtained from it, but that the land occupiers of Ireland are generally incompetent from want of skill to obtain it by labour-saving machinery. In England, it is in evidence that the labour-saving

machinery in use in agriculture is not so productive by one-half as the like machinery in use in the United States. And yet in England the yield, say of wheat, is double what it is in France or in Germany, and according to the examinations of the late Mr. Jenkins, the owner of land in *petite culture* works for this reduced produce twice as hard and for half the wages of a well-paid labourer in England. In Germany, the produce of every sort is one half what it is in England. In England, however, more than half the land that would be largely improved for profitable production by drainage, is as yet undrained. Of the possible augmentation of production in England by high culture it may be stated, that whilst the common production is as one, the high production of market garden culture is as three and a half, whilst the liquefied manure culture, as set forth by De Candolle as the future of agriculture, by giving food and water at the same time, is as five. And yet in the Metropolis, prepared plans for the distribution of fresh sewage have been set aside, and the fresh sewage which would yield the milk of 200,000 cows is thrown into the river Thames in a condition of putridity, to its gross pollution. In Ireland manure, sufficient for fertilising 17,000 acres, is similarly wasted.

Now in regard to the doctrine of the assumed natural check of pestilence to increase of population. In the investigation on the subject of Poor-law Relief I found that in the healthy agricultural districts the intervals of births, where the mothers suckled their own children, was about two years, and that where

there was a family of eight children the eldest would be sixteen years of age, the second fourteen, and the third twelve, capable of earning their own subsistence. In the depressed districts, on the other hand—the slums of the metropolis, more heavily ravaged by epidemics—the intervals of birth were only one year, the conceptions taking place immediately after. Extended experience shows that, except in such extraordinary pestilences as the Black Death, ordinary pestilences do not diminish population, but only leave it weakened. This may be exemplified from India, and elsewhere. As health and the duration of life are advanced, the proportion of births appears to be rather diminished, as in the well-to-do classes. It is shown that where wages increase, the pressure of population on the means of subsistence is diminished; that, instead of the cost of the production of land being fixed, it is generally reducible largely by science and machinery, whilst the amount of produce may be everywhere augmented, and that mostly in the regions of *petite culture*; that, instead of pestilence being the natural check to population, it does not diminish that pressure, but serves to weaken population and diminish its productive power, and increase the pressure of population on the means of subsistence. Malthus died shortly after I had explained these experiences to him, and I cannot tell what course he might have taken in respect to them.

I cannot descry the limits of a further advance of prosperity in this country with a further increase

of population. I expect it will be found with a fifth or a fourth more. And, then, as to external relief. It is declared by a French authority that only one-sixth part is yet inhabited of the cultivable parts of the world. It is established that in India "there are still 79,000,000 of acres of cultivable land not utilised, and the rate of produce might be increased so as to provide for an additional population of 400,000,000." Sir Robert Kane, the author of *The Industrial Resources of Ireland*, states that the cultivable land there is capable of three times greater production than at present; but that it requires capital, skill, and machinery beyond the competence of many of the present Irish landlords. In France and Germany a similar augmentation of production is practicable.

I have been much pressed to state whether I am really in favour of large families. My answer is that wide experience is in favour of them; but distinctly of healthy families; and that, where from concealed defects or from marriages contracted unwittingly, which occasion the transmission of hereditary disease, there is ground for legislation for the protection of the community by the dissolution of those marriages; and where parties are themselves aware of those conditions, and would avoid them, they may consult their physicians as to the means of doing so. In reference to the experiences of the large general policy, my colleague of the Institute, Wolowski, was wont to lament the loss of Alsace and Lorraine to France, as a loss greater in the quality than in the numbers

of the population lost. It was, he said, a loss of the highest energy, and ability of every kind. It was a district of large families, and of the greatest prosperity, contrasting strongly with the districts of France, where the families are the smallest and the population almost entirely stationary, where there is a comparative sterility of progress. My conviction is that the progress of the Anglo-Saxon population in the United States, in Canada, and in the Australian colonies is due mainly to the stimulus given, to outlook and to exertion, in providing for large families. These general experiences are corroborated by the observation of particular instances. A clergyman who had a family of nine children—four girls and five boys—had some connection with a Lord Chancellor, who, however, spoke of him as a person from his position of “small wants,”—“small wants” indeed, was the answer: of four husbands and of five professions. If he had had only two or three children, as in France, he might probably have dispensed with any outlook or exertion whatsoever. I happen to have known three middle-class families of twenty each. They were all healthy. The father was certainly kept on the stretch, on the outlook for them; but there was not one “ne’er do weel” amongst them; and two of them produced men of eminent distinction. Families of smaller numbers are known in Manchester who present the like illustrations.

As to the higher classes among us, the conditions are becoming more and more strongly prevalent in which

the superior educational institutions for them must change their course, and instead of teaching with the chief object of enabling their pupils to spend a thousand a year, must devote themselves to the object of enabling them to earn a thousand a year. In the very beneficial examinations for the Governmental competitions for the civil as well as the military service, those superior classes maintain their positions very well. As respects the many—the wage classes—the Governmental object will be to cheapen and to speed physical as well as mental training, on the half school-time principle, especially in the most formative periods—the infantile stages of life; to provide on the largest scale cheap works of sanitation; industrial drill and exercise; cheap washing and ventilation; cheap yet paying dinners; and the sanitary inspection of schools and workshops; and the use of every means of preventing the waste of life and productive power by excessive sickness and premature mortality. In the scriptural sense, children “are an heritage and a gift that cometh from the Lord. Like as the arrows in the hand of the giant, even so are the young children. Happy is the man that hath his quiver full of them. They shall not be ashamed when they speak with their enemies in the gate.”

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